ANNUAL SUMMARY OF ACTIVITIES

DIVISION OF RESEARCH

July 1, 2002 to June 30, 2003

Prepared by: Research Staff

October 2003

Report Number

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Connecticut Department of Transportation
Division of Research
James M. Sime, P.E.
Manager for Research

Office of Research and Materials
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PREFACE

The following is an administrative summary of the activities of the Division of Research for the Fiscal Year 2002-2003. Previous work, implemented research results and significant reports are listed herein.

Of the projects shown: one (1) was closed during Fiscal 2003; ten (10) in Part A are estimated to be completed and closed in Fiscal 2004; and the remaining will be continued to an acceptable conclusion. Three (3) new projects were initiated during FY03. Up to nine (9) new projects, subject to proposal and funding approvals, may be initiated during Fiscal 2003-2004 (See Part E).

Part D presents information on the implementation of research results into departmental operations during FY03.

Part E lists projects that in Fiscal Year 2002-2003 have been completed, discontinued or reassigned.

Part F outlines ConnDOT commitments to FHWA Pooled Funds and Cooperative Research Projects.

Parts H, I and J list reports on completed projects with federal and state funding, respectively. Parts K and L list film and video information available for departmental use in Research and Materials.

Parts M and N list research projects undertaken through the New England Transportation Consortium (NETC) and the Connecticut Cooperative Highway Research Program (CCHRP), respectively. Separate annual reports for these two programs are published.

Part O reports personnel assignments to various committees and panels engaged in transportation research.

The Internet homepage for Connecticut’s transportation research program is presnetly:

http.//www.dot.state.ct.us/1103/index.html

It is anticipated that in the second quarter of Fiscal Year 2003-2004, the URL for the research homepage will change to:

http://www.ct.gov/dot/research/index.html

James M. Sime, P.E.
Manager of Research

DIVISION OF RESEARCH STAFF (as of June 30, 2003)

James M. Sime, P.E.	Manager of Research
Susan G. Hulme	Secretary 2

RESEARCH, TECHNOLOGY TRANSFER & IMPLEMENTATION SECTION STAFF

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Lester A. King	Trans. Engineer 1
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SUMMARY OF ACTIVITIES

PART A

State Planning

and Research Funded Projects

October 2003

HPR-343
Implementation of Research Findings

OBJECTIVE

To cooperate with the FHWA, other Agencies and Towns toward implementation of research findings as they relate to Part II of the Approved SP&R Work Program and other research programs and projects.

PROJECT WORK STATUS

Project Started - July 1972

Project Status - Active

Work Done - July 1, 2002 to June 30, 2003

1. Maintained and updated Internet World Wide Web pages to disseminate information about the Department's program of transportation research, product evaluation and highway photologging. The URL changed and is now http://www.dot.state.ct.us/1103/index.html, but will be changing again in FY04 to http://www.ct.gov/dot/research/index.html.

   a. Updated the on-line research summary statement for the Connecticut transportation research program. The URL is http://www.dot.state.ct.us/1103/RAC.htm, but will be changing to http://www.ct.gov/research/rac.htm.

   b. Updated informational Web sites for two stationary and one truck-mounted Connecticut-developed Impact Attenuation systems, which include free downloadable plans. The present URL's are:

      i. CIAS(TL-3): http://www.dot.state.ct.us/1103/cias-information.htm
      ii. NCIAS(TL-3): http://www.dot.state.ct.us/1103/cias-information.htm
      iii. CTMA(TL-2): http://www.dot.state.ct.us/1103/ctma-information.htm

      The URL's for all three, above, will be changed in FY04 to start with "http://www.ct.gov/dot/research."

      This past year, Louisiana DOT and a Texas contractor fabricated truck-mounted attenuators from plan sheets posted to the ConnDOT Web site. Using the free plans, these crash cushions can be made around the country by local steel fabricators.

   c. Added a hyperlink to 2003 TRB Practical Papers Web site.

   d. Continued to add research-report hyperlinks for Connecticut and New England Transportation Consortium (NETC) to the Transportation Research Information Service/National Transportation Library (TRIS/NTL). The NTL is an online library hosted by the Federal Bureau of Transportation Statistics. The URL listing currently-available Connecticut and NETC on-line reports is http://www.dot.state.ct.us/1103/Online-Report-links.htm, and will be changed to http://www.ct.gov/dot/research/online-reports.htm.

   e. Developed an informational Web page for in-progress Department project SPR-2233, "Alternative Merge Signs at Signalized Intersections." The URL is http://www.dot.state.ct.us/1103/pro/SPR-2233/index.htm, but will be changed in FY04 to http://www.ct.gov/dot/research/pro/spr-2233/index.htm.

2. Forwarded TRB 2003 Annual Meeting Papers CD-ROM to the ConnDOT Library, which is responsible for lending them to requesting units in ConnDOT and other State Agencies.

3. Responded to numerous inquiries from within ConnDOT and from other states, FHWA, and other interested parties. Transmitted the results of ConnDOT research studies, non-ConnDOT technical reports, 117 questionnaires and surveys to inquiring parties. Details were reported in our quarterly reports.

4. Distributed FHWA Technical Summaries to interested units.

5. Reviewed and processed Category II work plans and reports, as required.

6. Implementation Log - the following reports were logged during the year and made available to appropriate units.

   a. FHWA – 5 General, 14 RD

   b. 59 NCHRP, 56 TRB, 0 SHRP, 0 TRR, 25 TCRP, 8 AASHTO and 2 NETC

   c. 123 other states
      8 miscellaneous reports
      78 Books/Manuals/Magazines

7. TRIS - On-line searches were conducted for various units during the fiscal year, which included 37 TRIS searches for NETC problem statements. Utilized TRIS/RIP search facility on the Internet (http://trbrip.tamu.edu). Also, provided the new Internet-based subscription to the TRIS/Transport bibliographic database to both our office personnel at the Rocky Hill research facility and the Technology Transfer Center at the University of Connecticut.

8. Continued support for the AASHTO Transportation and Civil Engineering (TRAC) program for Connecticut High Schools and Middle Schools. We estimate our high school participation was 400 students, up from 200 last year. About 200 students in middle schools participated in TRAC. TRAC volunteers participated in the Construction Career Day on October 8-9, 2002 where 1,400 students attended the event. A summary and photo montage is at: (http://www.cti.uconn.edu/ti/construction/ccd2002_photos.htm). The Department continued its agreement with the Connecticut Pre-Engineering Program to administer the program.

9. Photolog Supervisor Bradley Overturf continued to work with Rex Joffray at Connecticut Judicial Branch Law Libraries, Office of Information Systems, in East Hartford to put photolog software on Judicial's computers in the first of eight of their Connecticut branch law libraries (http://www.jud.state.ct.us/LawLib/).

10. TRNews, in its January-February 2003 issue published the 'Research Pays Off' article, "Bridge Monitoring Program in Connecticut" (http://www4.trb.org/trb/onlinepubs.nsf/web/rpo_intro). The article raised awareness of the technology, its capabilities and benefits.

11. Developed an informational brochure for the Connecticut Truck Mounted Attenuator (CTMA) and two stationary ConnDOT attenuators (CIAS & NCIAS). In cooperation with the Office of Maintenance, displayed a CTMA at the T2 Expo on September 18, 2002, Mansfield, CT, in an informational booth.

Please see the Implementation Section of this report for more information about the implementation of research findings during FY2003.

HPR-1213

Strategic Highway Research Program Coordination

OBJECTIVE

To cooperate as a participant in the Strategic Highway Research Program (SHRP) in coordination with the Federal Highway Administration. Emphasis is on review and implementation of SHRP products for use in Connecticut.

PROJECT WORK STATUS

Project Started - July 1, 1986

Project Status - Active

Work Done - July 1, 2002 to June 30, 2003

1. Completed final report and received FHWA approval for publication.

2. Prepared paper entitled, “Connecticut’s Experience with SHRP: A Retrospective,” for the Transportation Research Board 2004 Meeting.

SPR-1346

Monitoring of Cathodic Protection Systems

OBJECTIVE

1. Obtain operating power usage of alternate anode systems.

2. Monitor the operating characteristics and effectiveness of each type of anode system.

3. Continue monitoring all existing CP systems.

4. Prepare final report.

PROJECT WORK STATUS

Project Started – March 10, 1989

Project Status - Active

Work Done - July 1, 2002 to June 30, 2003

1. Continued routine site visits and recorded CP operating parameters for all Cathodic Protection Systems.

2. Coordinated with District Maintenance Offices to turn off power to Rectifier Cabinets/Bridge Decks to allow for structural repairs concrete deck overlay and exposed titanium mesh cathode.

3. Compiled a list of needed repairs to CP Bridge Rectifiers, which includes fuses, meters, outlets and miscellaneous repairs. Repairs are necessary due to damage caused by vandalism, rodents and natural causes, i.e., lightning.

4. Finished installing last of new commercial security padlocks with bolt-cutter proof guards on CP rectifier cabinets. New locks have now replaced all the destroyed, vandalized and inoperable padlocks.

5. Continued parparing draft of final report, incorporating previous review comments and suggestions for final report.

6. Anticipate study will recommend future project to assess the feasibility of remote monitoring equipment for CP Bridges in Connecticut.

7. Reviewed notes and records from previous site visits to Cathodic Protection System sites.

8. Worked with Corrpro representative reinstalling circuit boards to repair Bridge 5989 Rte. 44 over Willimantic River. Installation was successful; CP rectifier is again operational. Remaining required repairs to lightning arrestor fuses and switches are anticipated to be completed in September/October 2003.

9. Continued updates to all CP Bridge Deck chronologies, including digital image photos of top deck repairs, under deck spalling, rectifier cabinet/power supply vandalism.

10. Developing an instructional manual for the Cathodic Protection Rectifiers. A manual will be necessary for executing such functions as reference cell tests, depolarization tests, electrical current adjustments and routine maintenance issues. The Cathodic Protection Rectifiers instructional manual is anticipated to help facilitate the transition of CP Bridge responsibilities from the Office of Research to the Office of Bridge Maintenance.

REPORTS:

None

SPR-2107

Management – New England Transportation Consortium (NETC)

OBJECTIVE

To provide administrative support as the lead state for NETC, which includes responsibility for management of all NETC contracts under the associated Regional Pooled Fund Research projects, Nos. SPR-3(029) and SPR-3(089). The NETC was formed as a regional approach to developing innovative solutions to common transportation problems among the New England states. Its purpose is to pool the financial, professional and academic resources of the region and to use them to research and develop improved methods of dealing with common problems in the planning, design, construction, maintenance, rehabilitation, reconstruction, and operation of transportation systems in the participating states. The program is intended to supplement, not to replace, ongoing state and federal research activities and other national programs such as NCHRP.

The following goals were established for NETC in order to focus the resolve of participating state transportation agencies and universities:

- Implementation of a three-pronged program for the New England region consisting of research and development; technology transfer; and, education and training.
- Development of improved methods for dealing with common transportation problems.
- Providing an important source of trained professionals for employment in the Region.

PROJECT WORK STATUS

Project Started – January 1, 1996

Project Status - Active

Work Done - July 1, 2002 to June 30, 2003

ConnDOT Tasks

1. Attended three (3) Advisory Committee Meetings during the fiscal year.

2. Performed TRIS literature searches for the "'04 Series" Problem Statements.

3. Agreements:

   a. Completed processing of a Fifteenth Amendment Agreement [Agreement No. 11.27-02(02)] with the University of Connecticut to provide administrative, fiscal and technical management of the New England Transportation Consortium (NETC) for CY03.

   b. Completed processing of a revised NETC Standard Format Agreement (May 2003) [Agreement No. 5.06-02(03)].

Management – New England Transportation Consortium (NETC) (continued)

c. NETC 94-4, “Durability of Concrete Crack Repair Systems”

The Agreement for NETC Project No. 94-4 [Original Agreement No. 7.23-05(97), as amended by First Amendment Agreement No. 10.13-04(98) and Second Amendment Agreement No. 5.10-03(99)] expired on December 31, 1999. The Principal Investigator did not complete the study. A Notice of Expiration Letter, dated April 9, 2001, was forwarded to the University of Rhode Island, requesting the PI to cease all work activities on the project upon receipt of the Notice of Expiration Letter and that all material relating to the project be transmitted to the NETC Coordinator by June 8, 2001. The project material was forwarded to the NETC Coordinator. On August 17, 2001, the NETC Coordinator forwarded the project material to the Technical Committee for review. At its September 21, 2000, Meeting, the NETC Advisory Committee passed a motion that the Agreement be terminated. At its April 5, 2002, Meeting, the NETC Advisory Committee passed a motion to approve the Technical Committee recommendations that: the Final Report not be published; and, that the outstanding unpaid invoices not be paid.

d. NETC 95-5, “Buried Joints in Short Span Bridges”

A Termination Letter, dated April 9, 2001, was forwarded to the University of Rhode Island, terminating the Agreement [Agreement No. 5.07-02(97)] for NETC Project No. 95-5, effective June 8, 2001, and requesting the PI to cease all work activities on the project upon receipt of the Termination Letter. All material relating to the project was transmitted to the NETC Coordinator by June 8, 2001, as requested in the Termination Letter, and was forwarded to the Technical Committee for review on June 19, 2001. At its September 21, 2000, Meeting, the NETC Advisory Committee passed a motion that the Agreement be terminated. At its September 26, 2001, Meeting, the NETC Advisory Committee passed a motion to approve the Technical Committee recommendations that: the Final Report not be published; and, that the outstanding unpaid balance of $3,204.39 be withheld since only 70% of the work was completed.

e. NETC 99-2, “Evaluation of Asphaltic Plug Joints”

Completed processing of a First Amendment Agreement [Agreement No. 5.07-04(03)] with the University of Massachusetts, Dartmouth, to extend the term of the study from July 31, 2003, to December 31, 2003, at no additional cost.

f. NETC 00-3, “Design, Fabrication and Preliminary Testing of a Composite Reinforced Timber Guardrail”

Completed processing of a First Amendment Agreement [Agreement No. 8.06-01(02)] with the University of Maine to extend the term of the study from December 31, 2002, to May 31, 2003, at no additional cost.

Management – New England Transportation Consortium (NETC) (continued)

g. NETC 00-4, “Portable Falling Weight Deflectometer Study”

Completed processing of an Agreement [Agreement No. 6.21-04(02)] with the University of Maine to conduct a research study for NETC Project No. 00-4.

h. NETC 00-5, “Guardrail Testing – Modified Eccentric Loader Terminal (MELT) at NCHRP 350 TL-2”

Completed processing of a Purchase Order Contract [Purchase Order No. 500107657] with the Texas Transportation Institute to conduct NCHRP 350 crash tests for the Modified Eccentric Loader Terminal (MELT). Purchase Order No. 500107657 was paid on April 2, 2002.

i. NETC 00-6, “Implementation of Visual Technologies to Create Simplified Presentations by Highway Agencies”

Completed processing of a First Amendment Agreement [Agreement No. 11.22-01(02)] with the University of Connecticut to extend the term of the study from December 31, 2002, to June 30, 2003, at no additional cost.

j. NETC 01-1, “Advanced Composite Materials for New England’s Transportation Infrastructure: A Study for Implementation and Synthesis of Technology and Practice.”

1. The University of New Hampshire terminated the Agreement [Agreement No. 10.16-03(01)] for NETC 01-1, in writing, because the faculty members who were to act as the Principal Investigators are no longer available to conduct the project. No work was initiated and no costs were incurred.

2. A proposal submitted by Dr. Sergio Brena, University of Massachusetts, Amherst, ranked second by the NETC 01-1 Technical Committee in February 2001, and subsequently updated by Dr. Brena, was approved for funding by the NETC Advisory Committee.

3. Completed processing of an Agreement [Agreement No. 1.28-03(03)] with the University of Massachusetts, Amherst, to conduct a research study for NETC Project No. 01-1.

k. NETC 01-2, “Development of a Testing Protocol for Quality Control/Quality Assurance of Hot Mix Asphalt (HMA)”

Completed processing of a First Amendment Agreement [Agreement No. 7.18-03(02)] with the University of Massachusetts, Dartmouth, to extend the term of the study from August 31, 2002, to December 31, 2002, at no additional cost.

Management – New England Transportation Consortium (NETC) (continued)

l. NETC 01-3, “Design of Superpave HMA for Low Volume Roads”

1. Completed processing of a First Amendment Agreement [Agreement No. 1.28-02(03)] with the University of Massachusetts, Dartmouth to develop a set of guidelines for selecting the correct asphalt film thickness, and hence, the correct asphalt content for a mix with a particular gradation, at an additional cost of $26,902.

2. Initiated processing of a Second Amendment Agreement [Agreement No. 6.24-02(03)] with the University of Massachusetts, Dartmouth, to extend the term of the study from August 31, 2003, to February 29, 2004, at no additional cost.

m. NETC 02-1, “Relating Hot Mix Asphalt Pavement Density to Performance”

Initiated processing of an Agreement [Agreement No. 6.06-04(03)] with the University of Massachusetts, Dartmouth, to conduct a research study for NETC Project No. 02-1.

n. NETC 02-2, “Formulate an Approach for 511 Implementation in New England”

1. Completed processing of an Agreement [Agreement No. 6.21-03(02)] with the University of Massachusetts, Amherst, to conduct a research study for NETC Project No. 02-2.

2. Initiated processing of a First Amendment Agreement [Agreement No. 5.07-05(03)] with the University of Massachusetts, Amherst, to extend the term of the study from July 31, 2003, to December 31, 2003, at no additional cost.

o. NETC 02-3, “Establish Subgrade Support Values (M_r) for Typical Soils in New England”

1. Completed processing of an Agreement [Agreement No. 7.18-02(02)] with the University of Connecticut to conduct a research study for NETC Project No. 02-3.

2. Completed processing of a First Amendment Agreement [Agreement No. 2.28-02(03)] with the University of Connecticut to extend the term of the study from January 31, 2004, to January 31, 2005, at no additional cost.

p. NETC 02-5, “Determination of Moisture Content of Deicing Salt at Point of Delivery”

Completed processing of an Agreement [Agreement No. 6.21-05(02)] with the University of Connecticut to conduct a research study for NETC Project No. 02-5.

Management – New England Transportation Consortium (NETC) (continued)

q. NETC 02-6, “Sealing of Small Movement Bridge Expansion Joints”

Initiated processing of an Agreement [Agreement No. 6.09-01(03)] with the University of Connecticut to conduct a research study for NETC Project No. 02-6.

r. NETC 02-7, “Validating Traffic Simulation Models to Inclement Weather Conditions with Applications to Arterial Coordinated Signal Systems”

Completed processing of an Agreement [Agreement No. 6.21-07(02)] with the University of Vermont to conduct a research study for NETC Project No. 02-7.

s. NETC 02-8, “Intelligent Transportation Systems Applications to Ski Resorts in New England and Northeastern New York State”

Completed processing of an Agreement [Agreement No. 6.21-06(02)] with the University of Vermont to conduct a research study for NETC Project No. 02-8.

t. NETC 03-1, “Ability of Wood Fiber Materials to Attenuate Heavy Metals Associated With Highway Runoff”

Initiated processing of an Agreement [Agreement No. 6.24-01(03)] with the University of Connecticut to conduct a research study for NETC Project No. 03-1.

u. NETC 03-3, “Feasibility Study of Erosion Control Laboratory in New England”

Initiated processing of an Agreement [Agreement No. 6.06-05(03)] with the University of Connecticut to conduct a research study for NETC Project No. 03-3.

v. NETC 03-4, “Measuring Pollutant Removal Efficiencies of Stormwater Treatment Units”

Initiated processing of an Agreement [Agreement No. 6.06-06(03)] with the University of Massachusetts, Lowell, to conduct a research study for NETC Project No. 03-4.

w. NETC 03-5, “Evaluation of a Field Permeameter as a Longitudinal Joint Quality Indicator”

Initiated processing of an Agreement [Agreement No. 6.06-07(03)] with the University of New Hampshire to conduct a research study for NETC Project No. 03-5.

x. NETC 03-7, “Basalt Fiber Reinforced Polymer Composites”

Initiated processing of an Agreement [Agreement No. 6.06-08(03)] with the University of Connecticut to conduct a research study for NETC Project No. 03-7.

Management – New England Transportation Consortium (NETC) (continued)

NETC Coordination Tasks (UConn)

1. Attended three (3) Advisory Committee Meetings during the fiscal year.

2. Attended one (1) Policy Committee Meeting during the fiscal year.

3. Provided an exhibit at the AASHTO 2002 Trade Fair held on October 13-14, 2002, in the Egan Civic and Convention Center in Anchorage, Alaska.

4. Determined that NETC will provide an exhibit at the AASHTO 2003 Trade Fair to be held on September 7-8, 2003, in the Minneapolis Convention Center in Minneapolis, Minnesota.

5. Attended the NETC Organizational Meetings for the Technical Committees for the "'03 Series" projects.

6. Developed Scopes of Work for the "'03 Series" projects.

7. Issued Requests for Proposal (RFP's) for the "'03 Series" projects.

8. Distributed Proposals for the "'03 Series" projects to the Technical Committees for evaluation.

9. Evaluated and determined award of project funding for the "'03 Series" proposals.

10. Solicited Problem Statements for "'04 Series" projects from member state transportation agencies.

11. Performed screening, ranking and selection for the "'04 Series" Problem Statements.

12. Established Technical Committees for the "'04 Series" projects.

13. Attended the NETC Organizational Meetings for the Technical Committees for the "'04 Series" projects.

14. Coordinated efforts to allow the New York Department of Transportation (NYDOT) to participate in the NETC Program. NETC provided NYDOT with a list of the "'04 Series" projects selected for inclusion in the NETC Program. NYDOT will review the "'04 Series" projects and provide partial funding for the projects that are of interest to NYDOT.

15. The following projects were closed:

    a. Pre-1994 Project, "Construction Costs of New England Bridges - Phase II"

       The Pre-1994 project entitled, "Construction Costs of New England Bridges - Phase II," was closed on April 2, 2003.

Management – New England Transportation Consortium (NETC) (continued)

b. Pre-1994 Project, “Tire Chips as Lightweight Backfill – Phase II: Full-Scale Testing”

The Pre-1994 project entitled, “Tire Chips as Lightweight Backfill – Phase II: Full-Scale Testing,” was closed on April 2, 2003.

c. Pre-1994 Project, “Bridge Rail Crash Test – Phase II: Sidewalk Mounted Rail”

The Pre-1994 project entitled, “Bridge Rail Crash Test – Phase II: Sidewalk Mounted Rail,” was closed on April 2, 2003.

d. Pre-1994 Project, “New England Vehicle Classification and Truck Weight Program”

The Pre-1994 project entitled, “New England Vehicle Classification and Truck Weight Program,” was closed on April 2, 2003.

e. NETC 94-3, “Procedures for the Evaluation of Sheet Membrane Waterproofing”

NETC Project No. 94-3 was closed on April 2, 2003.

f. NETC 95-6, “Guidelines for Ride Quality Acceptance of Pavements”

NETC Project No. 95-6 was closed on April 2, 2003.

g. NETC 96-3, “Effectiveness of Fiber Reinforced Composites as Structural and Protective Coverings for Bridge Elements Exposed to Deicing-Salt Chlorides”

NETC Project No. 96-3 was closed on April 2, 2003.

h. NETC 99-4, “Quantifying Roadside Rest Area Usage”

NETC Project No. 99-4 was closed on April 2, 2003.

i. NETC 99-6, “Analytical and Experimental Investigation of the Effects of Concrete Removal Operations on Adjacent Concrete That Is to Remain”

NETC Project No. 99-6 was closed on November 19, 2002.

j. NETC 00-1,”Ground-Based Imaging and Data Acquisition Systems for Roadside Inventories in New England: A Synthesis of Practice”

NETC Project No. 00-1 was closed on November 19, 2002.

k. NETC 00-2, “Evaluation of Permeability of Superpave Mixes”

NETC Project No. 00-2 was closed on November 19, 2002.

Management – New England Transportation Consortium (NETC) (continued)

l. NETC 00-5, “Guardrail Testing - Modified Eccentric Loader Terminal (MELT) at NCHRP 350 TL-2”

NETC Project No. 00-5 was closed on November 19, 2002.

m. Technology Transfer 1998 Newsletter Activities.

The project was closed on April 2, 2003.

n. CY95 Coordination/Administration Activities.

The project was closed on April 2, 2003.

o. CY96 Coordination/Administration Activities.

The project was closed on April 2, 2003.

p. CY97 Coordination/Administration Activities.

The project was closed on April 2, 2003.

q. CY98 Coordination/Administration Activities.

The project was closed on April 2, 2003.

r. CY99 Coordination/Administration Activities.

The project was closed on April 2, 2003.

s. CY00 Coordination/Administration Activities.

The project was closed on April 2, 2003.

t. CY01 Coordination/Administration Activities.

The project was closed on April 2, 2003.

16. Distributed the following reports:

a. “Annual Report for Calendar Year 2001,” Report No. NETCR40, December 2002.

b. NETC 99-4, “Quantifying Roadside Rest Area Usage”

Garder, Per, Bosonetto, Nicholas. **“**Quantifying Roadside Rest Area Usage,” Report No. NETCR38, November 2002.

c. NETC 00-1,”Ground-Based Imaging and Data Acquisition Systems for Roadside Inventories in New England: A Synthesis of Practice”

DeGray, Jason and Hancock, Kathleen L. “Ground-Based and Data Acquisition Systems for Roadway Inventories in New England - A Synthesis of Highway Practice,” Report No. NETCR30, August 2002.

Management – New England Transportation Consortium (NETC) (continued)

d. NETC 00-2, “Evaluation of Permeability of Superpave Mixes”

Mogawer, Walaa S., Mallick, Rajib B., Teto, Matthew R. and Crockford, William C. “Evaluation of Permeability of Superpave Mixes,” Report No. NETCR34, July 2002.

e. NETC 00-5, “Guardrail Testing - Modified Eccentric Loader Terminal (MELT) at NCHRP 350 TL-2”

Albertson, Dean C., Menges, Wanda L. and Haug, Rebecca R. “Guard Rail Testing-Modified Eccentric Loader Terminal (MELT) at NCHRP 350 TL-2,” Report No. NETCR35, July 2002.

17. Produced the following papers and presentations:

None.

REPORTS

See Item 16 above.

SPR-2108

LTPP Coordination in Connecticut

OBJECTIVE

To cooperate as a participant in the Federal Highway Administration's Long Term Pavement Performance Program (FHWA-LTPP).

PROJECT WORK STATUS

Project Started – December 7, 2000

Project Status - Active

Work Done - December 7, 2002 - June 30, 2003

1. Work was conducted for the collection of traffic data at the LTPP sites, including:

    a. Calibration, validation and collection of traffic data according to LTPP protocols at the SPS-9 sites in Lebanon, CT (090900 and 090960).

    b. Conducted preventative maintenance of the Lebanon site including pavement crack-sealing, deterring of pest infestation, trouble-shooting and replacement of electronics.

    c. Work was conducted for the replacement of traffic data collection equipment for the Vernon (095001), Manchester (094008) and Groton (091803) test sites. Work included the acquisition of sensors and electronics; coordination with contractors; site lay-out designs and pavement shoulder repairs to the Manchester site. WIM systems were replaced in the GPS lanes with quartz piezoelectric technology in June 2003.

    d. Pavement longitudinal profile data was collected at the Vernon, Manchester and Groton sites for the purposes of WIM evaluations.

    e. Conducted review of the LTPP Traffic Data QA/Flag list (for Dec. 97 – July 00) and submitted comments to the Regional Contractor.

2. Work conducted for the LTPP SPS-9 sites is reported under the SPR-2219 Project.

3. FWD testing and a manual distress survey were conducted at the Groton test site on June 11, 2003. Pavement Markings were replaced. Lane closure was provided by ConnDOT.

4. Work continued on the SHRP Final Report to address review comments.

5. Participated in work for the LTPP Expert Task Group on Traffic Data Collection Committee meetings, teleconferences and group discussions via email.

6. Submitted rehabilitation forms for the Glastonbury (090420) site to the Regional Contractor.

7. Responded to inquiries for LTPP/SHRP Reports and Materials.

8. Continued to track the ConnDOT proposals to rehabilitate the area including test section 094020 on Route 2 in Glastonbury.

9. Profile testing was conducted by the Regional Contractor in November 2002, at the SPS-9A sites and the Groton site.

SPR-2214

(JH 93-4)

Hydrodynamics of Coastal Structures

OBJECTIVES

1. To review the current and proposed design practices and environmental issues related to granting permits by Conn DEP for highway hydraulic structures affecting tidal flushing and storm surges.

2. To conduct a state-of-the-art survey of tidal dynamics and property/material transport models which are related to highway hydraulic structures.

3. To develop a one-dimensional and a two-dimensional tidal model for applications in shallow coastal waters with complex topography.

4. To develop long-term two-dimensional mass transport models, for salinity, sediment and other parameters in coastal systems.

5. To establish coastal sites and set up instrumentation to collect data for model calibration and validation, tidal motion simulation, and ecological studies.

6. To conduct post audit studies on sedimentation and bio-chemical processes.

PROJECT WORK STATUS

Project Started - July 1, 1993

Project Status - Active

Work Done - July 1, 2002 - June 30, 2003

1. The Final Report is being finalized.

2. The PI’s travel and time commitments for other projects resulted in delays in completing the draft Final Report. As a result, this project is now scheduled to be completed in FY04.

REPORTS

Lin, J.D., Lefor, M.W., Hua, J.S., Rui, K. and Liao, W.G., "A Pseudo-2D Hydrodynamic Model for a Tidal River-Wetland System," Connecticut Department of Transportation, Cooperative Research Program Report No. 96-253, December 1996.

Lin, J.D., Lefor, M.W., Liao, W.G. and Qiu K.J., “Two-Dimensional Finite Volume Hydrodynamic Model for River-Marsh Systems: User’s Manual,” Connecticut Department of Transportation, Connecticut Cooperative Research Program Report No. JHR 02-275, June 2002.

Lin, J.D., Lefor, M.W., Liao, W.G. and Qiu K.J., “Two-Dimensional Finite-Volume Hydrodynamic Model for River-Marsh Systems: Tutorial,” Connecticut Department of Transportation, Connecticut Cooperative Research Program Report No. JHR 02-277, June 2002.

SPR-2216

“350” Crash Testing of Connecticut Impact-Attenuation Systems

OBJECTIVES

1. To verify various Connecticut impact-attenuation system designs by means of full-scale crash tests using NCHRP 350 Guidelines.

2. To develop implementation data and information to facilitate the use of these systems on a nationwide basis.

PROJECT WORK STATUS

Project Started - February 15, 1994

Project Status - Active

Work Done - July 1, 2002 to June 30, 2003

1. The current Principal Investigator, Dionysia F. Oliveira, has been assigned other time-critical tasks that have resulted in minimal work activities for this project. Two other employees in the Division of Research have been assigned the task of assisting D.F. Oliveira to complete the work activities for the project.

2. The draft NCIAS Crash Test Summary Report was submitted to the Federal Highway Administration (FHWA) for review.

3. Preparation of the draft CIAS Crash Test Summary Report was initiated and is now anticipated to be completed by June 30, 2004.

"350" Crash Testing of Connecticut Impact-Attenuation Systems (continued)

REPORTS

Alberson, D.C., "Test and Evaluation of the Connecticut Truck Mounted Attenuator - Test No. 2-51," Report No. 405241-1, November 1994.

Alberson, D.C., "Test and Evaluation of the Connecticut Truck Mounted Attenuator - Test No. 2-52," Report No. 405241-2, November 1994.

Alberson, D.C., "Test and Evaluation of the Connecticut Truck Mounted Attenuator - Test No. 2-53," Report No. 405241-3, January 1995.

Carney, J.F., III, Dougan, C.E., and Lohrey, E.C., "Summary of the Results of Crash Tests Performed on the Connecticut Truck-Mounted Attenuator (CTMA)," Report No. 2216-1-95-2, June 1995, and Transportation Research Board, TRR No. 1528, 1996.

Bullard, D.L., Jr., Menges, W.L., and Alberson, D.C., "Testing and Evaluation of the Merritt Parkway Guiderail," Report No. 405501, April 1996.

Alberson, D.C., and Menges, W.L., "Testing and Evaluation of the Connecticut Impact-Attenuation System (CIAS)," Report No. 405651-1&2, August 1996.

Buth, C.E., and Menges, W.L., "Testing and Evaluation of the Modified Connecticut Impact-Attenuation System (CIAS)," Report No. 405651-3&4, November 1997.

Lohrey, E.C., Carney, J.F., III, Bullard, D.L., Jr., Alberson, D.C., and Menges, W.L., "Testing and Evaluation of the Merritt Parkway Guiderail," Transportation Research Board, TRR No. 1599, 1997.

Buth, C.E., and Menges, W.L., "NCHRP Report 350 Test 3-33 of the Narrow Connecticut Impact-Attenuation System (NCIAS)," Report No. 404231-1, December 1997.

Buth, C.E., and Menges, W.L., "NCHRP Report 350 Test 3-32 of the Narrow Connecticut Impact-Attenuation System (NCIAS)," Report No. 404231-2, January 1998.

Buth, C.E., and Menges, W.L., "NCHRP Report 350 Test 3-37 of the Narrow Connecticut Impact-Attenuation System (NCIAS)," Report No. 404231-3, January 1998.

Buth, C.E., and Menges, W.L., "NCHRP Report 350 Test 3-38 of the Narrow Connecticut Impact-Attenuation System (NCIAS)," Report No. 404231-4, April 1998.

Smith, E., "Summary of the NCHRP 350 Crash Test Results for the Narrow Connecticut Impact Attenuation System," Report No. 2216-2-02-5, October 2002.

"350" Crash Testing of Connecticut Impact-Attenuation Systems (continued)

FILMS/VIDEOS

"Connecticut Truck-Mounted Attenuator (CTMA) Test No. 405214-1 (NCHRP Report 350. Test No. 2-51)," 16mm Work Print Film, Connecticut DOT, November 2, 1994.

"Connecticut Truck-Mounted Attenuator (CTMA) Test No. 405214-2 (NCHRP Report 350. Test No. 2-52)," 16mm Work Print Film, Connecticut DOT, November 3, 1994.

"NCHRP 350 Crash Tests 2-50, 51, 52 & 53, Abbreviated VHS Video Version," Connecticut DOT, December 1, 1994.

"NCHRP 350 Crash Tests 2-50, 51, 52 & 53, Full VHS Video Version," Connecticut DOT, December 1, 1994.

"Connecticut Truck-Mounted Attenuator (CTMA) Test No. 405214-3 (NCHRP Report 350. Test No. 2-53)," 16mm Work Print Film, Connecticut DOT, January 3, 1995.

"Connecticut Truck Mounted Attenuator (CTMA) Tests Nos. 405214-1, 2 & 3 (NCHRP Report 350 Tests Nos. 2-51, 2-52 & 2-53)," Abbreviated VHS Video Version, Connecticut DOT, January 1995.

"Connecticut Truck Mounted Attenuator (CTMA) Tests Nos. 405214-1, 2 & 3 (NCHRP Report 350 Tests Nos. 2-51, 2-52 & 2-53)," Full VHS Video Version, Connecticut DOT, January 1995.

"Merritt Parkway Timber Rail (MPG) Test No. 405501-1 (NCHRP Report 350 Tests No. 3-11)," VHS Video, Connecticut DOT, December 14, 1995.

"Merritt Parkway Timber Rail (MPG) Test No. 405501-2 (NCHRP Report 350 Tests No. 3-10)," VHS Video, Connecticut DOT, February 7, 1996.

"Merritt Parkway Timber Rail (MPG) Test No. 405501-3 (NCHRP Report 350 Tests No. 3-11 w/curb)," VHS Video, Connecticut DOT, February 8, 1996.

"Merritt Parkway Timber Rail (MPG) Test No. 405501-4 (NCHRP Report 350 Tests No. 3-21)," VHS Video, Connecticut DOT, February 28, 1996.

"NCHRP 350 Crash Test No. 405501-1, Merrit Parkway Timber Rail," ConnDOT, April 1, 1996.

"NCHRP 350 Crash Test No. 405501-2, Merrit Parkway Timber Rail," ConnDOT, April 1, 2996.

"NCHRP 350 Crash Test No. 405501-3, Merrit Parkway Timber Rail," ConnDOT, April 1, 1996.

"NCHRP 350 Crash Test No. 405501-4, Merrit Parkway Timber Rail," ConnDOT April 1, 1996.

"Connecticut Impact Attenuation System (CIAS) Tests Nos. 405651-1&2 (NCHRP Report 350 Tests Nos. 3-32 & 3-38)," VHS Video, Connecticut DOT, May 1996.

"350" Crash Testing of Connecticut Impact-Attenuation Systems (continued)

"NCHRP 350 Crash Test No. 405651, Parts 1 & 2, Connecticut Impact Attenuation System," ConnDOT, August 1, 1996.

"Connecticut Impact Attenuation System (CIAS) Tests No. 405651-3 (NCHRP Report 350 Tests No. 3-35)," VHS Video, Connecticut DOT, October 14, 1997.

"Connecticut Impact Attenuation System (CIAS) Tests No. 405651-4 (NCHRP Report 350 Tests No. 3-33)," VHS Video, Connecticut DOT, October 27, 1997.

"Narrow Connecticut Impact Attenuation System (NCIAS) Tests No. 404231-1 (NCHRP Report 350 Tests No. 3-33)," VHS Video, Connecticut DOT, October 28, 1997.

"Narrow Connecticut Impact Attenuation System (NCIAS) Tests No. 404231-2 (NCHRP Report 350 Tests No. 3-32)," VHS Video, Connecticut DOT, December 15, 1997.

"Narrow Connecticut Impact Attenuation System (NCIAS) Tests No. 404231-3 (NCHRP Report 350 Tests No. 3-37)," VHS Video, Connecticut DOT, December 16, 1997.

"Narrow Connecticut Impact Attenuation System (NCIAS) Tests No. 404231-4 (NCHRP Report 350 Tests No. 3-38)," VHS Video, Connecticut DOT, March 2, 1998.

"Narrow Connecticut Impact Attenuation System (NCIAS) Tests No. 404231-5 (Repeat of NCHRP Report 350 Tests No. 3-38)," VHS Video, Connecticut DOT, June 8, 1998.

"Narrow Connecticut Impact Attenuation System (NCIAS) Tests No. 404231-6 (NCHRP Report 350 Tests No. 3-39)," VHS Video, Connecticut DOT, June 9, 1998.

"Connecticut Impact Attenuation System (CIAS) Test No. 404231-7 (NCHRP Report 350 Test No. 3-34)," VHS Video, Connecticut DOT, April 19, 1999.

PROJECT WEB SITES

Connecticut Truck Mounted Attenuator (CTMA):

http://www.dot.state.ct.us/1103/CTMA-information.htm
will become, in FY04, http://www.ct.gov/dot/research/CTMA-information.htm

Connecticut Impact Attenuation System (CIAS):

http://www.dot.state.ct.us/1103/CIAS-information.htm
will become, in FY04, http://www.ct.gov/dot/research/CIAS-information.htm

Narrow Connecticut Impact Attenuation System (NCIAS):

http://www.dot.state.ct.us/1103/NCIAS-information.htm
will become, in FY04, http://www.ct.gov/dot/research/NCIAS-information.htm

Alternative Merge Signs at Signalized Intersections:

http://www.dot.state.ct.us/1103/pro/spr-2233.htm
will become, in FY04, http://www.ct.gov/dot/research/pro/spr-2233.htm

SPR-2217

Bridge Monitoring Network in Connecticut

OBJECTIVES

1. To develop a network of bridges instrumented with permanent continuous monitoring systems that are remotely accessible from a centralized location. The systems will monitor the structural behavior of several bridges using a variety of sensors, depending on the bridge type and design.

2. To investigate developments in bridge monitoring technology so that appropriate instruments can be incorporated into these systems as budgets allow. The information gained from this research will be used to develop systems for all bridges.

PROJECT WORK STATUS

Project Started - June 1, 1994

Project Status - Active

Work Done - July 1, 2002 - June 30, 2003

1. Set up strain gages on bridge 03522 (route 372 over Route 9) to evaluate a super load (in excess of 1 million pounds) for Bridge Safety and Evaluation. Provided results (data) of strain gaging in Excel spreadsheet.

2. Attended meeting with Purcell Associates and ConnDOT's Consultant Bridge Design section to develop a scope for a future monitoring system on the new Pearl Harbor Memorial Bridge.

3. Attended meeting with WMC Associates and ConnDOT's Consultant Bridge Design section to include details on monitoring system to be added to Avon Bridge. This bridge will be a concrete New England Bulb Tee (NEBT) and replaces the Wallingford site.

4. Completed strain gage installation at Middletown site. Installed panel in cabinet with terminal blocks, signal conditioner and data logger attached. Electricity and phone lines in place and operational.

5. Began taking voltage readings of corrosion monitoring devices placed in the deck of the Church Street, New Haven Bridge. These devices were installed to monitor the mmfx steel that was substituted for epoxy coated bar.

6. Maintained operational systems in East Hartford (#05686), Old Saybrook (#6200) and Hartford (#05868).

REPORTS

DeWolf, J.T. and Zhao, J., "Dynamic Vibration Techniques in Highway Bridge Monitoring," Report No. CEE-98-1, May 1998.

D'Attilio, P.F., Feldblum, E.G., Lauzon, R.G., "Strain Monitoring of the Devon Railroad Bridge," December 2001.

PROJECT WEB PAGE

Strain Monitoring on Bridge # 03522 for a permit load in excess of 1 Million pounds:
http://www.dot.state.ct.us/1103/Superload2002/superload2002-information.htm
will change, in FY04 to,
http://www.ct.gov/dot/research/superload2002/superload2002.htm

SPR-2219

Demonstration and Evaluation of SUPERPAVE™ Technologies

OBJECTIVE

1. To assess the QC/QA procedures set forth in NCHRP Project 9-7.

2. To evaluate the performance of SUPERPAVE™ mixes using both virgin and recycled aggregates.

PROJECT WORK STATUS

Project Started: April 18, 1996

Project Status: Active

Work Done: July 1, 2002 - June 30, 2003

1. Six 1000 ft test sections placed in 1997 continue to be monitored:

LTPP Section	
090901	Class 1
090902	Superpave Virgin 64-28
090903	Superpave Virgin 64-22
090960	Class 1 with RAP
090961	Superpave RAP 64-28
090962	Superpave RAP 64-22

2. Obtained twenty-four six-inch diameter pavement cores in June 2003 within sections 090961 and 090962, in order to determine cause of premature deterioration within a few hundred feet of the sections.

3. Maintained signs and pavement field markings at the six test sections, for the LTPP program.

4. LTPP regional contractor obtained Falling Weight Deflectometer data and performed manual distress surveys in September 2002.

5. Performed friction testing of the Route 2 project during October 2002 and April 2003.

6. In preparation for the final evaluation report, a final visual distress survey was performed in the field in March 2003.

7. The final 5-year evaluation report was prepared from March – June 2003.

8. Collected and downloaded continuous data from the weigh-in-motion site installed at this site, in Lebanon (both directions).

9. Attended meetings of the Superpave Implementation Section of the Task Force for HMA Pavement Improvement.

REPORTS

Larsen, D.A., & Rodrigues, N.J., “Demonstration and Evaluation of SUPERPAVE Technologies – Construction Report for Route 2,” Report No. 2219-1-97-5, December 1997.

Larsen, D.A., “Demonstration and Evaluation of SUPERPAVE Technologies – Final Evaluation Report for CT Route 2,” Report No. 2219-F-02-7, June 2003. (DRAFT)

PROJECT-RELATED WEB PAGES

ConnDOT Informational Web Page on Superpave:
http://www.dot.state.ct.us/bureau/eh/ehcn/road/superpav.htm

ConnDOT Specifications for Superpave:
http://www.dot.state.ct.us/bureau/eh/ehen/desserv/Processing/Sprovisions/0406441A.DOC

SPR-2221

Testing and Evaluation of an Automated Sign Identification System (ASIS)

OBJECTIVE

The objective of this study is to establish a statement of accuracy for the Automated Sign Identification System (ASIS) that identifies stop signs from videolog images. Stop signs are regulatory signs critical for safe driver operation on the highway network.

PROJECT WORK STATUS

Project Started: August 27, 1998

Project Status: Active

Work Done: July 1, 2002 - June 30, 2003

1. Work on project was concluded due to state-imposed travel ban, and results to date will be published.

2. Initiated preparation of final report on project.

REPORTS

None

SPR-2222

Development of Guidelines for Reduction of Temperature Differential Damage (TDD) for Hot Mix Asphalt Pavement Projects in Connecticut

OBJECTIVE

1. To develop methods for the reduction of TDD to HMA pavement projects in Connecticut.

2. To determine if a relationship exists between nuclear density measurements and cold spots/areas that occur during paving operations.

PROJECT WORK STATUS

Project Started: September 3, 1998

Project Status: Active

Work Done: July 1, 2002 - June 30, 2003

1. Monitored six sites for pavement distress.

    a. Site 1 – Rte 85 NB (25.655-25.855 km), Colchester

    b. Site 2 – Rte 85 SB (25.855-25.655 km), Colchester

    c. Site 3 – Rte 8 NB (64.001-64.201 km), Thomaston

    d. Site 4 – Rte 691 EB (6.888-7.149 km), Killingly

    e. Site 5 – Rte 31 WB (8.828-8.628 km), Coventry

    f. Site 6 – Pigeon Hill Road, Windsor

REPORTS

Henault, J.W., “Development of Guidelines for Reduction of Temperature Differential Damage (TDD) for Hot Mix Asphalt Pavement Projects in Connecticut – Construction Report,” Report No. 2222-1-99-5, November 1999.

SPR-2223

Evaluation of Alternative Fuel Light Trucks and Automobiles

OBJECTIVE

To gather first- and second-hand data and information about the performance of alternative fuel light trucks and automobiles; analyze and synthesize the materials; and, develop findings to aid State and Federal officials that must comply with Section 507(o), the Energy Policy and Conservation Act of 1992 (EPACT).

PROJECT WORK STATUS

Project Started: February 16, 1999

Project Status: Active

Work Done: July 1, 2002 - June 30, 2003

1. Received monthly data forms from personnel driving ten EV pickups at this Department (1) and the Department of Environmental Protection/State Parks (8). Entered data for future analysis. Andrew Mroczkowski continued to coordinate this task.

2. Collected data from EV subcompact with Nickel Cadmium (NiCd) batteries (15.6 kWh capacity). On May 11, 2003 the NiCd-EV subcompact (Lic. 'EV-1') was taken out of service after 30,000 miles of normal operation. The year-round driving range was not less than 70 miles per recharge. In FY2004, data from the 30,000-miles driven over 4 years will be analyzed and published.

3. Continued collecting data from compressed natural gas (CNG) subcompact, which is operated as a Research pool car. The vehicle CNG car operated normally this past year. Dionysia Oliveira continued to coordinate tabulation of data, which were recorded by drivers. In the fourth quarter, for reasons of fiscal austerity the State Fleet recalled vehicles with less than 1,000 miles/month of usage. The CNG car monthly mileage averages were: 495 miles in 2000; 540 miles in 2001; 661 miles in 2002; and, 275 miles for the first three months of 2003. In FY2004, data from the 20,000-miles driven over 3 years will be analyzed and published.

4. Initiated retrofits of two additional EV subcompacts from The Rideshare Company. Throughout the year, delays were experienced in obtaining some of the components. The two 1995 EV subcompacts are receiving direct-drive with advanced batteries (168V) and fuel-fired heaters to add statistical credibility to study findings and provide a platform for possible future conversion to a fuel-cell hybrid, inspired by the NJ DOT design. The conversion includes development of liquid-type battery-cooling that utilizes the car's factory air conditioning system. In May 2003 the original NiCd EV (Lic. 'EV-1') was sent to receive two additional batteries, a new controller and battery cooling system upgrade. When completed in FY2004, all three cars will be equivalent in features and capabilities, and the next data acquisition phase will be initiated.

REPORTS

None

SPR-2228

Implementation of Personal Digital Assistant (PDA) Devices for Superpave Field Data Collection

OBJECTIVE

The objective of this study is to evaluate PDA devices for field operations, and develop PDA-based data collection, reduction, analysis and reporting procedures for Superpave activities related to HMA material quality assurance by field inspectors.

PROJECT WORK STATUS

Project Started: July 19, 2000

Project Status: Active

Work Done: July 1, 2002 - June 30, 2003

1. Continued preparation of final report.

REPORTS

None

SPR-2229

Application of Infrared Thermographic Imaging to Bituminous Concrete Pavements

OBJECTIVE

1. Evaluate temperature differences between silo storage and HMA direct from mixer.

2. Evaluate effect of night paving on temperature profile for HMA.

3. Evaluate effect of cold weather paving on the temperature profile for HMA.

4. Evaluate effect of cold weather night paving on the temperature profile for HMA.

5. Evaluate temperature differences observed between Superpave mixes and conventional ConnDOT mixes.

6. Evaluate density and air permeability differences between areas that have significantly different temperatures within the same general location in the mat.

PROJECT WORK STATUS

Project Started: September 1, 2000

Project Status: Active

Work Done: July 1, 2002 – June 30, 2003

1. Collected data for Fall 2002 and Spring 2003 construction season.

2. Performed analyses of data collected.

3. Submitted draft final report for review.

4. Agreements:

    a. Completed processing of a Second Amendment Agreement [Agreement No. 4.18-01(02)] with the University of Connecticut to extend the term of the study from August 31, 2002, to April 15, 2003, at no additional cost.

REPORTS

Myers, Leslie A., Mahoney, James M., Stephens, Jack E., “Application of Infrared Thermographic Imaging to Bituminous Concrete Pavements,” Interim Report, August 2001.

Mahoney, James M., Stephens, Jack E., DaDalt, John A. and Zinke, Scott A., “Application of Infrared Thermographic Imaging to Bituminous Concrete Pavements,” Final Report – Draft, July 2003.

SPR-2230

Development and Implementation of a Highway Construction Quality Assurance Program for the Connecticut Department of Transportation, Phase I – Hot-Mix Asphalt Concrete Construction

OBJECTIVE

To accomplish a series of technical tasks necessary to achieve successful implementation of a Quality Assurance (QA) program for Hot-Mix Asphalt (HMA) construction at the Connecticut Department of Transportation (ConnDOT).

PROJECT WORK STATUS

Project Started: January 2001

Project Status: Active

Work Done: July 1, 2002 – June 30, 2003

1. Completed field data collection for two “focus projects” in the 2002 paving season. Field data collection included sampling at the point of placement (“POP” sampling) in order to evaluate the feasibility of sampling at a location where it is possible to account for most of the variability “as placed.” In addition, additional samples were collected at the plant and QC, Acceptance, and Independent Assurance samples were collected as required by current specifications and provisions in each case.

   The first focus project was a Vendor-In-Place (VIP) project on Route 94 in the town of Glastonbury, which afforded an opportunity to study daytime and limited right-of-way conditions, and sampling with and without a materials-transfer device present.

   The second project was a Construction project in Darien and Norwalk, on Interstate 95. This provided a night-time, high-traffic, late-season paving environment.

   The data collected by project personnel has been used for analysis purposes only. Items to be determined and validated with additional focus projects are: required number of samples; development of QC curves and risk factors; and, issues in comparison of data sets.

2. Conducted Quality Assurance (QA) training for project inspectors and project engineers in five (5) sessions, to continue to familiarize State personnel with QA concepts and issues.

3. As part of the effort to identify data-management requirements, developed a demand-based procedure to track samples obtained in the field while at the same time geo-referencing field data. By linking field, laboratory, and project data, the system is designed to assign accountability for sample requests and sample test information and provide prompt feedback to the Project Engineer as

well as the Contractor regarding material quality, and at the same time provide a means to archive the data for retrieval by personnel responsible for monitoring the condition of the roadway and the performance of the pavement, and relating construction quality characteristics to performance.

4. Outlined activities for the 2003 paving season. Two additional focus projects were selected: I-384 Manchester, and Route 6 in Columbia-Mansfield-Windham. These projects will provide an opportunity to test the POP sampling procedure as refined over the winter months, to test the sample-tracking system, and to collect additional data for analysis of QA issues.

REPORTS

None

SPR-2231

Feasibility of Streaming Media for Transportation Research and Implementation

OBJECTIVE

1. To investigate and compare the quality and utility of streaming media production tools, and client and server software offered from Microsoft.

2. To determine if streaming technologies can be used to distribute traffic camera video to both ConnDOT desktops via the network as well as the public via the Internet.

3. To examine all relevant issues concerning “The Americans with Disabilities Act” (ADA) and handicap accessibility and implement as required.

4. To provide on-going publishing-tool training and support to Research staff for the creation of their own streaming media topics.

5. To implement an in-house streaming-media network-server; design and integrate a streaming-media presentations and Web pages for demonstrating the potential value and utility of streaming media technologies.

6. To provide presentations to Department staff and assist with determining the feasibility of implementing a streaming media capability for ConnDOT.

PROJECT WORK STATUS

Project Started: January 29, 2001

Project Status: Active

Work Done: July 1, 2002 – June 30, 2003

1. Identified, examined, and purchased all relevant Microsoft streaming media development applications. Initially, utilized Macromedia Flash-MX to create presentations and then exported them as uncompressed AVI files and converted them to Windows Media using both Microsoft Windows Media Encoder 7.1 and the Series-9 software. Utilized Producer for PowerPoint 2002 and 2003 for creating effective presentations.

2. Non-Microsoft software applications utilized during this phase of the project were: Macromedia’s Flash-MX and Authorware-6: Discreet’s Cleaner-5; and, Apple’s Quicktime-5 PRO.

SPR-2231

Feasibility of Streaming Media for Transportation
Research and Implementation (continued)

3. Modified scope-of-project to encompass ConnDOT's existing highway-traffic-camera-video infrastructure with the objective of determining if streaming media technologies could efficiently deliver this video to both Department desktops and the public via the Internet.

4. Initiated work with vendors to develop or identify an affordable 100-200 video camera streaming media appliance for the Traffic Management's Newington Highway Operations Center that will fit in a one-rack-unit.

5. Met with representatives from the State's Department of Information Technology (DOIT) in order to gain their support for deployment of our streaming media server on their existing Internet backbone. A draft memorandum of understanding (MOU) was developed and submitted in July for their consideration. Installation of ConnDOT's first Internet streaming server at DOIT is anticipated sometime in FY2004.

REPORTS

None

SPR-2232

Lateral Variation in Pavement Smoothness

OBJECTIVES

BACKGROUND:

The Connecticut Department of Transportation (ConnDOT) employs roadway roughness or smoothness as a major factor in determining corrective actions for pavement surfaces. States have conducted research on methods to measure and record smoothness, and IRI (International Roughness Index) is the measure recommended. Given IRI as the parameter of choice, and that ConnDOT already obtains IRI using its photolog vans traveling in the outside lane, the need exists to determine if IRI varies by lane. It is assumed that pavement distress will vary also for different lanes of the roadway. If the IRI and recorded distresses differ from those recorded in the outside lane, then the service life of any pavement placed can be significantly under-designed, resulting in costly maintenance.

The project objectives are to:

1 – Determine representative IRI values for one or more lanes adjacent to the outer lane; and,

2 – Determine the distress in adjacent lane or lanes and delineate any causative factors uncovered for this distress.

PROJECT WORK STATUS

Project Started: September 1, 2001

Project Status: Active

Work Done: July 1, 2002 to June 30, 2003

1. Project completed and closed effective December 31, 2002.

ConnDOT Tasks

1. Attended various project meetings.

2. Participated in the development of the final report.

CTI Tasks

1. Completed and submitted a paper for presentation and/or publication at the 2003 Annual TRB Meeting. The paper was accepted for presentation at a poster session.

Lateral Variation in Pavement Smoothness (continued)

2. Presented a PowerPoint summary of project activities to date at the Northeast States Materials Engineers Association (NESMEA) on October 30, 2002, in Newport, Rhode Island.

3. Selected four (4) test routes and developed a 5-year trend in IRI for all test routes.

4. Reviewed photolog images and compared them to typical IRI data and outliers that were dropped from the data set.

3. Initiated analysis of rutting data and its possible relationship to IRI.

4. Completed linking of WISECRAX® distress data to GIS coordinate data.

5. Completed a draft final report that was reviewed by the Advisory Panel. The report will be published in hard copy and on CD and will be posted on ConNDOT's website.

Meetings Attended

1. Hosted Advisory Panel Meetings on September 12, 2002, November 21, 2002 and June 5, 2002, in Rocky Hill, Connecticut.

2. Held research team Progress Meetings to assure all participants are aware of project work and accomplishments.

REPORTS

Mahoney, James M., et al, "Application of Infrared Thermographic Imaging to Bituminous Concrete Pavements," Final Report, July 2003.

Dougan, C.E., et. al., "Lateral Variation in Pavement Smoothness," ConnDOT Report Number 2232-F-02-4, December, 2002.

SPR-2233

Alternative Merge Signs at Signalized Intersections

OBJECTIVES

1. To develop, field test, and evaluate a prototype warning sign, that should allow an improvement in the traffic flow and merging pattern at some signalized intersections.

2. To provide justification for the new warning sign to be adopted by the State Traffic Commission and inclusion in the Manual of Uniform Traffic Control Devices (MUTCD).

PROJECT WORK STATUS

Project Started – September 1, 2001

Project Status - Active

Work Done - July 1, 2002 – June 30, 2003

1. An electrical contractor installed the video cameras and communication interface panels at both the Farmington (Intersection of Route 4 with Town Farm Rd.) and Southington (Intersection of Route 229 with West St. #1) location on July 9-10, 2002. Shortly following the installation, the systems at each location were calibrated and configured with a manufacturer's technician representative, during September.

2. Monitored existing site conditions and driving behaviors, at the two field locations with the "Lane Ends" sign (MUTCD Code: W-4) and collected data on the merging pattern.

3. Completed speed detection calibration and software training with the manufacturer's software specialist.

4. Created and launched an Intranet and Internet informational webpage for the SPR-2233, "Alternative Merge Sign at Signalized Intersections" research project.

5. Introduced and deployed the experimental alternative merge sign at the two field locations (Southington and Farmington) in March.

6. Began and continue monitoring the site conditions and driving behaviors with the experimental alternative merge sign in place at the two field locations.

7. Requested and received approval for a one-year time extension for the project. The revised anticipated completion date is August 31, 2004.

8. Continued data analysis of the merging patterns that existed before and after the experimental signs were installed.

REPORTS

None

PROJECT-RELATED WEB PAGES

ConnDOT Informational Web Page on Alternate Merge Sign Evaluation:

http://www.dot.state.ct.us/1103/pro/spr-2233.htm

will become, in FY04,

http://www.ct.gov/dot/research/pro/spr-2233.htm

SPR-2234

Performance Evaluation of Whitetopping and Superpave at a High-Volume Interchange

OBJECTIVE

1. To monitor, evaluate, and document the construction and performance of whitetopping, a concrete pavement overlay on top of a hot-mix asphalt (HMA) pavement, at a location to be determined.

2. To monitor, evaluate, and document the construction and performance of Superpave PG 76-22, a mix design new to Connecticut, on an adjacent off-ramp and on-ramp from Woodmont Road to I-95 Southbound in Milford, CT.

3. To monitor, evaluate, and document the construction and performance of Superpave PG 64-28, the most common Superpave mix design currently being used in Connecticut, on an on-ramp from Woodmont Road to I-95 Northbound in Milford, CT.

4. To compare the 3 types of pavement listed above as to their ability to resist wheel path rutting and to resist cracking during five years of in-service monitoring.

PROJECT WORK STATUS

Project Started: May 6, 2002

Project Status: Active

Work Done: July 1, 2002 – June 30, 2003

1. Performed field reviews of the state construction project currently under construction including condition surveys of the final course of HMA pavements as completed.

2. Due to the elimination of whitetopping from the construction project, a new location and project to install it is being sought. This selection process has included reviewing rutting data, receiving input from District and other ConnDOT personnel, as well as reviewing information on the status of design projects.

3. Reviewed reports of Whitetopping installations in other states.

4. Collected rutting data on the final HMA pavement course for baseline information. Roughness data was also collected with the ARAN where possible.

5. Compiled historic volume and vehicle classification data.

6. Reviewed the specification for whitetopping to be included in a future design project.

REPORTS

None

SPR-2235

Program Development for the Connecticut Transportation Institute

OBJECTIVES

BACKGROUND:

The Connecticut Transportation Institute (CTI) has the potential to offer many and varied services to all sectors of the transportation community. Many elements of CTI activity are not widely known, although several CTI staff have been recognized for their substantial contributions to federal, state, and local research and technology transfer efforts. This proposal sets forth a series of tasks designed to describe the unique capabilities of CTI, and to develop a strategic plan for the establishment of a long term, self-sustaining program of research and technology transfer resident in the CTI. These tasks are:

- Develop descriptive materials for the CTI.
- Monitor various solicitations for research and technology transfer.
- Develop proposals in response to the above solicitations.
- Develop a strategic plan for CTI.

PROJECT WORK STATUS

Project Started: January 1, 2003

Project Status: Active

Work Done: July 1, 2002 to June 30, 2003

1. Established Project Advisory Team.

2. Polled several state transportation institutes and solicited background data on structure, staffing, management, financing and program areas.

3. Initiated effort to establish a University Transportation Center at UConn.

4. Initiated work to develop a brochure describing the CTI. Brochures from 20 other Transportation Institutes have been obtained. The material has been reviewed and recommendations on form and format are being developed.

5. Obtained information on various, commercially available, demonstration booths. A demonstration booth has been selected and purchase of the unit initiated.

6. Initiated monitoring of research solicitations.

    a. A listing of CTI and University staff has been prepared.

b. Three (3) requests for proposals were reviewed, thought to be of interest, and circulated for response.

c. A pre-proposal has been sent to the University of New Hampshire on the subject of using recycled shingles in HMA.

d. Four (4) proposals have been submitted by Aultman-Hall and Holmen, two (2) by Aultman-Hall with non-CTI researchers and one (1) by Garrick and Aultman-Hall [a total of two (2) have been funded, one (1) declined and four (4) are pending].

7. A listing of CTI and University staff has been prepared. Three requests for proposals were reviewed, thought to be of interest, and circulated for response.

8. Peer Exchange – Funding for this activity will come from the project's travel item in the budget. A panel has been selected and the exchange will be held on July 30-31, 2003, and August 1, 2003, at the Nathan Hale Inn and Conference Center. Denise Saunders of the FHWA Division Office has agreed to act as facilitator for the exchange. At this time, background data and information are being assembled for the panel members.

9. Meetings Attended:

a. Strategic Planning Session for CTI staff, Storrs, CT, March 26, 2003.

b. Project Advisory Team Meeting, Storrs, CT, April 9, 2003.

The following major determinations were made: (a) A peer exchange will be conducted to provide constructive input on the management and organization of the CTI and to provide new research venues for CTI to address; and, (b) the brochure will not be finalized until the peer exchange has been conducted. Information on brochures from other institutes will be sought and assessed for possible use by the CTI staff.

Reports

None

SPR-2236

New Technologies for Photolog Image and Data Acquisition

OBJECTIVE

ConnDOT's Data Services Section (DSS) will identify high-resolution camera systems and implement them for advanced applications such as automated roadway sign, bridge number, utility pole number, lane and sign striping and curb attribute recognition. Recent developments in high-resolution digital cameras and high-definition television cameras (HDTV) will enhance current imaging applications and support the development of new applications. The project will also establish the feasibility of an automated bridge underclearance measurement module installed on the photolog collection platform.

PROJECT WORK STATUS

Project Started: February 2003

Project Status: Active

Work Done: February 1, 2003 - June 30, 2003

1. Established Advisory Team consisting of DSS, Research, Information Systems, Rights of Way, Design, Connecticut Transportation Institute (CTI) and DSS developers.

2. The first of three project phases is complete: Conducted a study of digital imaging hardware. Involved a combined effort of the CTI and DSS resulting in identification of a camera system to be used on ConnDOT photolog vehicles. A DVC 1300X1030 resolution camera and a Thompson Grass Valley High-definition (HD) camera with Canon lens were tested and selected for procurement.

3. Prepared specification and completed purchasing process for experimental camera system.

REPORTS

None

SPR-2237

Field Evaluation of Concrete Containing Disodium Tetrapropenyl Succinate (DSS)

OBJECTIVES

1. Study the field performance of concrete barriers containing the DSS additive and its ability to reduce concrete permeability, increase passivity of the embedded reinforcing steel and provide air entrainment for greater durability.

2. Monitor corrosion of the reinforcing steel in experimental and control barriers with the use of embedded half-cell probes.

PROJECT WORK STATUS

Project Started – February 20, 2003

Project Status - Active

Work Done - February 20, 2003 - June 30, 2003

1. Experimented with alterations to mix design keeping the water/cement ratio constant. To achieve the desired result of 4000 psi at 28 days the use of a super-plasticizer was necessary. A total of 7 experimental mix designs were made.

2. A total of 25 barriers were made using the DSS additive. Half-cell corrosion monitoring devices were installed in DSS barriers and standard mix barriers to be used for future comparison. The control barriers will be used for comparison to determine what affect the DSS additive has in reducing corrosion in reinforcing steel. Measurements will be taken to determine the voltage drop of both types of barrier with a conventional multi-meter. Increases in voltage drop measurements are indicative of active corrosion taking place on the embedded reinforcing steel.

3. Met with project engineer (Russ Wagoner) to discuss shipping and placement of barriers within a highway construction project. It was originally thought that these barriers would be included in the I-84 Southington project (Project No. 151-274/294). It now looks like these barriers will be placed in the I-84 Plainville project (Project No. 109-0153).

4. Collected an initial benchmark reading from half-cell probes placed within DSS and control barriers. Uniform results were collected from all eight gages and a decrease in voltage was attributed to the drying out or curing of the concrete.

REPORTS

None

SPR-2305

Advanced Pavement Laboratory (CAP Lab) at UConn

OBJECTIVE

1. To provide fee-based testing, for highway pavement materials, utilizing the SHRP methods.

2. To provide guidance in mix design for private industry.

3. To advise on mix acceptance and field construction.

4. To educate engineers and train technicians and inspectors in the SHRP methods.

5. To provide research on the SHRP methods.

PROJECT WORK STATUS

Project Started – July 12, 1995

Project Status - Active

Work Done - July 1, 2002 to June 30, 2003

1. Administration of CAP Lab

    a. Conducted four (4) quarterly Advisory Board Meetings.

    b. Participated in ConnDOT Task Force to improve HMA pavements and several subgroups of same.

    c. Completed the process of hiring a Research Engineer and Computer Analyst to support the Quality Assurance project.

    d. Agreements:

        - Completed processing of an Eighth Amendment Agreement [Agreement No. 4.08-05(02)] with the University of Connecticut to extend the term of the study from June 30, 2002, to June 30, 2003, at no additional charge.

        - Completed processing of a Ninth Amendment Agreement [Agreement No. 8.07-03(02)] with the University of Connecticut to conduct work activities for FY03.

        - Completed processing of a Tenth Amendment Agreement [Agreement No. 5.14-04(03)] with the University of Connecticut to conduct work activities for FY04.

2. Training and Technical Services

    a. Attended the following meetings and conferences:

        - Technology Transfer Center Quarterly Meeting, July 25, 2002.

Advanced Pavement Laboratory (CAP Lab) at UConn (continued)

- NECEPT Steering Committee Meeting, July 29, 2002, in Danbury, CT.
- NETTCP QA Technologist Committee Meeting, August 23, 2002, in Methuen, MA.
- JHRAC Meeting, September 17, 2002, in Storrs, CT.
- NETTCP QA Technologist Committee Meeting, September 27, 2002, in Methuen, MA.
- NESMEA, October 29-30, 2002, in Newport, RI.
- NEAUPG Annual Meeting, October 30-31, in Newport, RI.
- Technology Transfer Center Quarterly Meeting, October 16, 2002, in Storrs, CT.
- North Eastern States Pooled Fund Project Video Conference, November 5, 2002, in Glastonbury, CT.
- NETTCP QA Technologist Pilot Course, December 2-5, 2002, in Worcester, MA.
- NETTCP QA Technologist Committee Meeting, October 4 and December 12, 2002, in Methuen, MA.
- NETTCP Board of Directors Meetings, October 24, 2002, and December 12, 2002, in Methuen, MA.
- Connecticut Bituminous Conrete Producers Association Annual Meeting, November 13, 2002, in Wallingford, CT.
- Transportation Research Board, Annual Conference, January 12-16, 2003, in Washington, DC.
- ARTBA Education and Research Division, Annual Meeting, January 13, 2003, in Washington, DC.
- TRB Committee A2D04 meeting, January 14, 2003, in Washington, DC.
- NETTCP Board of Directors Video Conference, January 30, 2003, Glastonbury, CT.
- Association of Asphalt Pavement Technologist, Annual Meeting, March 9-12, 2003, in Lexington, KY.
- NETTCP Board of Directors meeting, March 20, 2003, in Methuen, MA.
- North East Asphalt User/Producer Group meeting, March 25, 2003, in Danbury, CT.

Advanced Pavement Laboratory (CAP Lab) at UConn (continued)

- Strategic Planning Committee for Connecticut Transportation Institute, April 9, 2003, in Storrs, CT.
- Connecticut Bituminous Concrete Producers Association Quarterly and Annual Meetings, April 15 and 16, 2003.
- Technology Transfer Center Advisory Committee Meeting, May 15, 2003, in Newington, CT.
- JHRAC Meeting, June 19, 2003, in Storrs, CT.
- NETTCP Board of Directors Video Meeting, May 22, 2003, in Glastonbury, CT.
- Round Table discussion about the use of crumb rubber in asphalt pavements, sponsored by the Chelsea Center, June 23, 2003, in Westboro, MA.
- CASE Meeting with TRB representative on June 23, 2003.
- TRB Representative visit to CAP Lab on June 25, 2003.

b. Updated CAP Lab web site, as required.

c. Conducted the following training:

- Hosted Surveying workshop sponsored by Technology Transfer Center on September 24-25, 2002.
- The CAP Lab participated as volunteers for the Technology Transfer Center’s Construction Career Days, October 7-8, 2002, in Wallingford, CT.
- Conducted NETTCP Soils and Aggregate Laboratory Technician Course, March 4-7, 2003, at the CAP Lab.
- Volunteered at the Massachusetts Construction Career Days held on April 2, 2003, in Hopkinton, MA.
- Conducted NETTCP PG Binder Technician Certification Courses, April 22-24, 2003, and May 14-16, 2003, at the CAP Lab.
- Conducted NETTCP Soils and Aggregate Inspector Course, April 15-17, 2003, at the CAP Lab.
- Hosted Technology Transfer Workshops for Homeland Security for Municipalites on May 20-22, 2003, and Chainsaw Safety on May 28-29, 2003.

Advanced Pavement Laboratory (CAP Lab) at UConn (continued)

d. Provided the following technical services to ConnDOT and others (where noted):

- Provided technical services to Connecticut DOT for pavement placed in Wallingford Salt Storage Shed, July 15-19, 2002.
- Assisted ConnDOT QA project data collection on Route 94 in Glastonbury, CT.
- The CAP Lab provided Superpave Mix design demonstration for the Connecticut DOT's Pavement Advisory Team, January, 24, 2003, at the CAP Lab.
- Provided technical assistance to the Towns of Glastonbury on May 9, 2003, and Greenwich and Guilford on May 16, 2003.

3. Round Robin Testing

a. Continued participation in the AMRL Proficiency Samples, as available.

b. Distributed samples for Superpave Gyratory Round Robin to HMA producers supplying material to Connecticut.

c. Collected and tested gyratory specimens from participants in the gyratory round robin. Submitted final report to the DOT.

d. Sand samples collected by the ConnDOT have been fractionated into sizes passing the #4 sieve retained on the #8, retained on the #16 sieve and retained on the #30 sieve. These samples have been washed and placed in the ConnDOT freeze-thaw unit for additional testing. Results should be available by the end of July 2003. Also, the same sand samples have been batched out for incorporation into mixes to determine their effect on the dynamic modulus of the mixture.

e. Developed draft procedure to correlate HMA cores with readings taken with Nuclear Density Gauges.

f. Began collecting field data to validate the draft core-correlation procedure.

g. Conducted evaluation of Superpave on two low-traffic roadways in CT.

4. Conduct research to improve Superpave Technology

a. Continued participation in FHWA Pooled Fund Study No SPR-0003(056), "Superpave Implementation Support – The Northeast Superpave Center (NECEPT)," till the project ended during FY03.

b. Began participation in FHWA Pooled Fund Study No. TPF-5(062), "Coordination of Pavement Activities in the Northeast." CAP Lab is Contractor to Lead State (Connecticut).

c. Performed Preliminary Dynamic Modulus testing on HMA with and without "red" sand. Results submitted to ConnDOT.

Advanced Pavement Laboratory (CAP Lab) at UConn (continued)

d. After mechanical problems with the DOT freeze-thaw unit were resolved, completed freeze-thaw cycling of various sands from around Connecticut to determine their susceptibility to degradation from freeze-thaw cycles. The results of this work have been submitted to the DOT.

5. Develop HMA Designs.

a. None.

6. Provide Independent Test Results and Independent Assurance Testing.

a. Provided PG Binder testing services for Tilcon-Connecticut for certifying the PG Grade of the binder in mix designs that contain RAP.

b. Provided Direct Tension testing services for Hudson Liquid Asphalts in Providence, RI.

c. Provided PG Binder Testing Services for Tilcon-CT and VHB, Inc., for Superpave mixes containing RAP.

REPORTS

Dougan, C.E., “Strategic Plan for the Connecticut Advanced Pavement Laboratory,” January 1998.

Mahoney, J. and Stephens, J.E., “Comparison of AASHTO Moisture Sensitivity Test (T-283) with Connecticut Department of Transportation Modified Test Method – Final Report,” Report No. CAP Lab 99-1, August 1999.

PROJECT-RELATED WEB SITE

ConnDOT Web Site

http://www.dot.state.ct.us/1103/UConn-CAP-Lab-link.htm

or http://www.ct.gov/dot/research/uconn-cap-lab-link.htm

SPR-2306

Installation and Evaluation of a Weigh-In-Motion System Utilizing Quartz-Piezo Sensor Technology

OBJECTIVE

The objective of this study is to install a Quartz-Piezo based WIM System, and to determine sensor survivability, accuracy and reliability under actual traffic conditions in Connecticut's environment.

PROJECT WORK STATUS

Project Started – October 1, 1997

Project Status - Active

Work Done - July 1, 2002 - June 30, 2003

1. Downloaded data periodically and conducted visual checks for functionality.
2. Conducted data analyses.
3. Conducted trouble-shooting to electronics and consequentially repairs caused by electrical storm damage.
4. Hot sealed sensors and cracks as part of pavement/sensor maintenance.
5. Conducted calibrations/validations at the site using trucks of known weight.
6. Conducted maintenance to deter rodent infestation.
7. Responded to numerous project inquiries.

REPORTS

McDonnell, A.H., "Preliminary Report on the Installation and Evaluation of Weigh-In-Motion Utilizing Quartz-Piezo Sensor Technology," Report No. 2306-1-98-3, June 1998.

Larsen, D.A. and McDonnell, A.H., "Second Interim Report on the Installation and Evaluation of Weigh-In-Motion Utilizing Quartz-Piezo Sensor Technology," Report No. 2306-2-99-7, November 1999.

McDonnell, A.H., "Evaluation of Quartz-Piezoelectric WIM Sensors: Second Year Study, North American Travel Monitoring Exhibition and Conference (NATMEC) 2000, August 2000.

McDonnell, A.H., "Evaluation of a Weigh-In-Motion System Utilizing Quartz-Piezoelectric Sensor Technology," Pre-Proceedings of the Third International Conference on Weigh-In-Motion (ICWIM3), May 2002.

Summary of Activities

Part B

Non-SPR Funded Projects

October 2003

R.P. 175-116 #43

Support Activities for the Connecticut Guide Rail Program

OBJECTIVES

To develop a semi-automated/computerized inventory data collection system for guide rails on Connecticut State-maintained roadways.

PROJECT WORK STATUS

Project Started - July 1998

Project Status - Active

Work Done - July 1, 2002 - June 30, 2003

1. Continued development of a semi-automated process to query the guiderail database and provide standard-format files for rendering on Microstation files with roadline data.

2. Obtained lists of projects where guiderail may have been updated in 1999 and 2000.

3. Work was curtailed on this program after October 2002, due to commitment to ConnDOT Quality Assurance program research project (SPR-2230).

REPORTS

None

R.P. 170-2202

Connecticut DOT Highway Curvature Measurement

OBJECTIVES

To evaluate the existing ConnDOT horizontal curvature algorithm, and develop and validate a new ConnDOT vertical curvature algorithm.

PROJECT WORK STATUS

Project Started - September 1998

Project Status - Active

Work Done - July 1, 2002 – June 30, 2003

1. ConnDOT completed all required data collection and distribution tasks, as requested in the May 11, 2001 memorandum from Central Surveys.

2. Sent to David Harkey (University of North Carolina) examples of how to determine/compare the beginning/end of the curve reduction data vs. the beginning/end for the photolog vehicle's data collection passes. David Harkey replied that he was not prepared to determine the start/ends himself as he did not have access to CADD. Robert Kasica then undertook all of the start/end determinations, also known as segment matching information.

3. Reviewed District 2's final submission of photolog projects. Passed the completed files to David Harkey. Reminded District 2 and Central Surveys to forward any missing files.

4. District 2 personnel decided that they could not undertake any more curve reduction work involved with the HSIS project. All subsequent curve reduction work was done at the Data Services office by Robert Kasica. Robert Kasica did the curve layout work and the results were forwarded to Central Surveys for review prior to the use of Eagle Point software. (Eagle Point is used to derive a listing of a series of lines and arcs from a CAD plan of a road's centerline.) Later, other roadlines were quantified at the District 1 office.

5. Central Surveys personnel reviewed and approved the road centerline curve layout. Miguel Bosse of Central Surveys used Eagle Point software to create the road centerline stationing and created large scale plots of the CAD plans. The plots were mailed to David Harkey.

6. Prior to David Harkey's receiving of the results, Robert Kasica reformatted the data output of Central Surveys' Eagle Point software to resemble the data output of the Horizontal Curvature Software.

7. It was noticed in late summer of 2002 that some of the photolog van collection runs did not geographically match to the survey plans. The sections in question were then collected by Data Services personnel. The raw data was in turn sent to Peter van Dine for processing, who in turn sent the processed data to David Harkey for analysis.

8. At David Harkey's request, plots were made for a number of plans/roadlines at the District 1 office with the help of Edward Szkoda, and the plots were sent to David Harkey.

9. Peter Van Dine, the author of the PLVHC software program, discussed with David Harkey of the UNC the difficulties encountered in evaluating the PLVHC program.

10. David Harkey and his assistant, Chang Yi, requested that Robert Kasica derive curvature values directly from the plotted Applanix data points. A newer Applanix system was undergoing evaluation at the same time as the data was being collected for the HSIS study. The Applanix generated roadline was to have served as a substitute for survey maps that were supposedly not produced. However the Survey plans were found to have been completed. Roadline curve reduction was then completed using the same methods used for the previous roadlines.

11. David Harkey indicated that he had no access to any CAD programs and thus could not view either the survey plans nor manipulate/recalculate the curve results. Robert Kasica created an Excel spreadsheet with formulas intended to help with the task of adjusting or recalculating some of the compound curves encountered in the study. Formulas were taken from surveying textbooks and practices. Also formulas not found in standard manuals were derived and used in producing a spreadsheet that emulates certain functions of much more complicated and expensive licensed survey programs. This spreadsheet program allows the user to enter data for the curves under consideration; allows the user to change certain curve parameters; to immediately view the results on a plan/graph; and, to read the numerical outputted values resulting from the user defined changes. This Excel spreadsheet was sent to UNC.

12. Sent and resent segment matching information on a number of routes. Also resent and clarified survey plan curve data on a number of routes.

13. Documented procedures in curve reduction work.

REPORTS

None prior to June 30, 2003. Initial draft report under review July 2003.

CTTRANSIT Demonstration and Evaluation of
Hybrid Diesel Electric Transit Buses
Project Number 170-1884

OBJECTIVE

The objective of this project is to procure, demonstrate and evaluate hybrid diesel electric powered heavy-duty transit buses. Our goal is to identify the next generation of transit vehicles for future fleet replacement. We are looking for a vehicle, which is cost effective, reliable, produces fewer emissions, and has an improved fuel economy when compared to the standard heavy-duty diesel powered bus. Data will be collected in order to produce a life cycle cost analysis.

PROJECT WORK STATUS

Project Started: April 16, 2000

Project Status: Active

Work Done: July 1, 2002 – June 30, 2003

1. A project team was assembled which includes the following partners: the vehicle manufacturers, the Connecticut Department of Transportation, the Connecticut Transportation Institute at the University of Connecticut, the Connecticut Academy of Science and Engineering and the East Coast Hybrid Consortium.

2. Through an RFP process, two hybrid diesel electric buses were ordered, manufactured, shipped to Connecticut and placed into revenue service on June 16, 2003. Program data collection began July 1, 2003.

3. The Technical Advisory Committee held a meeting and gave a presentation on the program goals, schedule, budget and testing protocol for the Connecticut Academy of Science and Engineering on March 3, 2003. Our University of Connecticut partners made a presentation on exhaust gas and PM measuring equipment as well as a presentation on the new nano particle measurement component of the program which was recently added to the project scope.

4. After over a year of research the Technical Advisory Committee completed their analysis of exhaust gas analyzers, selected the best model for the test program protocol and issued a purchase order to buy the equipment which is currently under manufacture. A problem with the **CT**TRANSIT chassis dynamometer identified in late June, 2003 is under investigation and may require a change in the emissions testing design component of the program.

5. Negotiations were completed with the East Coast Hybrid Bus Consortium. They committed $100,000.00 in funding in order to participle in our project.

6. UCONN upgraded and re-calibrated our mini-dilution tunnel which will be utilized for measurement of particulate matter.

REPORTS

Connecticut Academy of Science "Review of CTTRANSIT Diesel Bus Research Program", Published March 18, 2003

Summary of Activities

Part C

Operational Tasks

October 2003

HPR-1271

Technology Transfer Center

OBJECTIVES

1. Expand and enhance existing efforts of ConnDOT and UConn in transferring highway and transportation technology to local agencies.

2. Improve communication on technical transportation issues between Federal, State, Local and Technology Transfer Center organizations.

3. Encourage implementation of effective highway and transportation procedures and technology at the local level.

4. Compile and disseminate the experience of the selected participants to further optimize the technology transfer program for all concerned parties.

PROJECT WORK STATUS

Project Started - July 1, 1983

Project Status - Active

Work Done - July 1, 2002 to June 30, 2003

1. The Center held three (3) Advisory Committee Meetings during the fiscal year.

2. The mailing list for the Center's Technology Newsletter was updated and decreased from 4,936, at the start of the fiscal year, to 4,238, at the end of the fiscal year. The decrease in the mailing list occurred because of the following:

    - Duplications in the mailing list were eliminated.

    - The Technology Transfer Center mailing list included a mailing list for NETC Advisory Committee members and Technical Committees. A decision was made to segregate that information to a separate database.

    Three (3) newsletters have been published during the fiscal year.

3. Presented workshops, demonstrations, seminars, conferences and/or short courses on twenty-one (21) subjects of interest to local agencies. Approximately 3,515 individuals attended the workshops. The workshops, demonstrations and/or short courses were:

	TITLE	DATE	LOCATION
a.	Basics of a Good Road (A Connecticut Road Master Program Required Workshop)	June 11, 2002 June 12, 2002 June 13, 2002	Storrs, CT Stamford, CT Hartford, CT

Technology Transfer Center (continued)

	TITLE	DATE	LOCATION
b.	Flagger Certification (A Connecticut Road Master Program Elective Workshop)	June 24, 2002 June 25, 2002 June 25, 2002 June 26, 2002 June 26, 2002 June 27, 2002 June 28, 2002 July 1, 2002 July 2, 2002	Storrs, CT Storrs, CT Storrs, CT Storrs, CT Storrs, CT Storrs, CT Storrs, CT Storrs, CT Storrs, CT
c.	All About Asphalt (A Connecticut Road Master Program Required Workshop)	July 23, 2002 July 24, 2002 July 25, 2002	Hartford, CT Storrs, CT Torrington, CT
d.	Principles of a Road Maintenance Management System for Local Road Agencies (A Connecticut Road Master Program Elective Workshop)	August 13-14, 2002 August 15-16, 2002	Hartford, CT Hartford, CT
e.	Powers and Responsibilities of a CT Municipal Legal Traffic Authority (A CT Municipal Legal Traffic Authority Program Required Workshop)	August 27, 2002 August 28, 2002	Storrs, CT Hartford, CT
f.	2002 Connecticut Technology Transfer Expo (A Connecticut Technology Transfer Center Partnership Event with CHSSA)	September 18, 2002	Storrs, CT
g.	Surveying Methods for Local Roads (A Connecticut Road Master Program Elective Workshop)	September 24, 2002 September 25, 2002	Storrs, CT Storrs, CT
h.	Supervisory Skills (A Connecticut Road Scholar Program Required Workshop)	October 8, 2002	Storrs, CT
i.	2002 Connecticut Construction Career Day (A Connecticut Technology Transfer Center Partnership Event with CCIA)	October 8-9, 2002	Wallingford, CT
j.	Fundamentals of Analyzing and Solving Local Traffic Problems (A CT Municipal Legal Traffic Authority Program Required Workshop)	October 16, 2002 October 17, 2002	Hartford, CT Storrs, CT

Technology Transfer Center (continued)

	TITLE	DATE	LOCATION
k.	Planning and Managing Local Road Snow and Ice Operations for Local Roads (A Connecticut Road Master Program Required Workshop)	November 4, 2002 November 5, 2002 November 6, 2002	Storrs, CT Storrs, CT Storrs, CT
l.	Infrastructure Asset Management (A Connecticut Road Scholar Program Elective Workshop and a Professional Development Workshop)	January 28-29, 2003	Hartford, CT
m.	Traffic Calming (A Connecticut Technology Transfer Center Partnership Event with CASHO)	March 14, 2003	New Britain, CT
n.	Superpave for Municipalities (A Connecticut Road Master Program Elective Workshop)	March 25, 2003 March 27, 2003	Torrington, CT Storrs, CT
o.	Effective Communication Skills (A Connecticut Road Master Program Required Workshop)	April 15, 2003 April 16, 2003 April 17, 2003	Hartford, CT New Britain, CT Storrs, CT
p.	Making Work Zones Better Conference (A Connecticut Technology Transfer Center Partnership Event with ConnDOT)	April 15, 2003	New Britain, CT
q.	Chainsaw Operating Techniques (A Connecticut Road Master Program Elective Workshop)	April 28, 2003 April 29, 2003	Storrs, CT Storrs, CT
r.	Public Works: Planning for and Responding to Terrorism/Weapons of Mass Destruction (A Connecticut Road Scholar Program Elective Workshop)	May 20-22, 2003 May 28-30, 2003	Storrs, CT Bloomfield, CT
s.	Managing the Small Highway Department (A Connecticut Road Master Program Elective Workshop)	June 3, 2003 June 4, 2003 June 5, 2003	Rocky Hill, CT Waterbury, CT Storrs, CT
t.	Designs for Pedestrians and Bicycles in Connecticut (A Connecticut Road Scholar Program Elective Workshop)	June 10, 2003	Storrs, CT
u.	Context Sensitive Solutions (A Connecticut Technology Transfer Center Partnership Event with ConnDOT)	June 26, 2003	Storrs, CT

Technology Transfer Center (continued)

4. The Center was represented at the following meetings, conferences, workshops, demonstrations, seminars and/or short courses, related to new technologies, program development, staff development and program administration:

	TITLE	DATE	LOCATION
a.	Meeting with ConnDOT and UConn Representatives to Discuss T2 Involvement in the 2003 Context Sensitive Solutions Training Program	June 12, 2002	Storrs, CT
b.	Technology Transfer Expo 2002 Planning Group Meeting with Members of the CHSSA Board of Directors	June 20, 2002	Storrs, CT
c.	Meeting with Tom Dupont, Dupont Associates to Discuss Proposal for Future Web-Based Training Applications	June 21, 2002	Storrs, CT
d.	Presentation to CHSSA Board of Directors Meeting Regarding New Road Scholar Program and Technology Transfer Expo Status	July 2, 2002	East Lyme, CT
e.	Meeting with Don Perrault (Work Zone Safety/Flagger Instructor) to Discuss Feedback from WZS Workshops and Proposed Changes to Curriculum Based on this Feedback	July 11, 2002	Storrs, CT
f.	Presentation on T2 Center to Regional Planning Organization Director’s Meeting	July 18, 2002	Rocky Hill, CT
g.	2002 Connecticut Construction Career Day Executive Committee Planning Meeting	July 18, 2002 October 3, 2002	Storrs, CT Wallingford, CT
h.	National LTAP Conference (Hosted by Region One Centers)	July 27-31, 2002	Burlington, VT
i.	2002 CT Construction Career Day Planning Committee – (General Meeting of All Interested Parties)	August 8, 2002	Wethersfield, CT
j.	Technology Transfer Expo Planning Committee Meeting	August 20, 2002 September 5, 2002	Storrs, CT Storrs, CT

Technology Transfer Center (continued)

	TITLE	DATE	LOCATION
k.	Connecticut State Highway Supervisor's Association Board Meeting	September 10, 2002	East Lyme, CT
l.	2002 Connecticut Technology Transfer Expo (A Connecticut Technology Transfer Center Partnership Event with CHSSA)	September 18, 2002	Storrs, CT
m.	2002 Connecticut Construction Career Day (A Connecticut Technology Transfer Center Partnership Event with CCIA)	October 8-9, 2002	Wallingford, CT
n.	Technology Transfer Center Advisory Committee Meeting	October 16, 2002 January 21, 2003 May 15, 2003	Storrs, CT Newington, CT Newington, CT
o.	National LTAP Clearinghouse Advisory Committee Fall Work Plan Development Meeting	October 21-24, 2002	Honolulu, HI
p.	CASHO Education Committee Meeting	October 30, 2002	New Britain, CT
q.	FHWA Pooled Fund Project No. TPF-5(062), "Coordination of Pavement Activities in the Northeast," Proposal Videoconference	November 5, 2002	Via videoconference
r.	2002 CT Construction Career Day Executive Committee De-Briefing Meeting	November 6, 2002	Storrs, CT
s.	Meeting to Discuss 2003 T2 Work Plan with Representatives from ConnDOT (James M. Sime), FHWA (Barbara Breslin) and UConn (Donna M. Shea)	November 21, 2002	Glastonbury, CT
t.	Meeting to Discuss 2003 Context Sensitive Solutions (CSS) Training Program with Representatives from ConnDOT (Carl Bard and Simone Cristofori) and UConn (Donna M. Shea)	November 21, 2002	Newington, CT
u.	2003 Transportation Research Board Meeting	January 11-14, 2003	Washington, DC

Technology Transfer Center (continued)

	TITLE	DATE	LOCATION
v.	Infrastructure Asset Management Professional Development Workshop	January 28-29, 2003	Hartford, CT
w.	Meeting with Fisher Signs to Discuss Final Design of Safety Town Project	January 30, 2003	Prospect, CT
x.	RAC Conference Meeting with Hilton Hotel	February 5, 2003	Mystic, CT
y.	Meeting with Dawnlight Company to Discuss Training Proposal for Beijing Professional Traffic College in China	February 7, 2003	Storrs, CT
z.	Planning Committee Meeting for Making Work Zones Work Better Seminar	February 25, 2003 March 6, 2003 March 26, 2003	Newington, CT New Britain, CT Newington, CT
aa.	2003 Connecticut Construction Career Day Executive Committee Planning Meeting	March 4, 2003	Wethersfield, CT
bb.	CTI Internal Strategic Planning Session	March 26, 2003	Newington, CT
cc.	Walkable Communities Workshop (Sponsored by Boston MPO and Walkable Communities, Inc.)	March 28, 2003	Somerville, MA
dd.	Massachusetts Construction Career Day	April 2, 2003	Hopkinton, MA
ee.	CTI Program Development Project Advisory Committee Meeting	April 9, 2003	Storrs, CT
ff.	Bike/Ped Workshop Curriculum Development Meeting	April 10, 2003	Storrs, CT
gg.	“Making Work Zones Better” Conference	April 15, 2003	New Britain, CT
hh.	Proposal Development Meeting on Potential LTAP Application for Streaming Media	April 25, 2003	Storrs, CT
ii.	New England Homeland Security Meeting	April 29, 2003	Manchester, NH
jj.	Meeting with West Hartford Public Works Director to Discuss New Workshop Site	May 7, 2003	West Hartford, CT

Technology Transfer Center (continued)

	TITLE	DATE	LOCATION
kk.	Connecticut Bicycle & Pedestrian Conference	May 16, 2003	New Haven, CT
ll.	Design for Pedestrians and Bicycles in Connecticut	June 10, 2003	Storrs, CT
mm.	Technology Transfer Expo Planning Committee Meeting	June 11, 2003	Storrs, CT
nn.	Construction Career Day Executive Committee Meeting	June 11, 2003	Storrs, CT
oo.	LTAP Annual Regional Meeting	June 16-18, 2003	Ithaca, NY
pp.	Context Sensitive Solutions Workshop Planning Meeting with ConnDOT Staff	June 19, 2003	Newington, CT
qq.	Meeting with Anthony Murray, USDOT Outreach Program on Hazmat Training Opportunities	June 24, 2003	Storrs, CT
rr.	Transportation Research Board Visit to the Connecticut Transportation Institute	June 25, 2003	Storrs, CT

5. Responded to 138 requests from people from local government agencies, Universities, State government agencies, federal government agencies, consultants, contractors, and private citizens, for Information Services/Technical Assistance and publications/videotapes/software.

6. Provided 138 publications, 26 videotapes and 15 software packages in response to these requests. In addition, 4,454 publications and 55 software packages were distributed at training programs and conferences.

7. The Technology Transfer Circuit Rider Program provided the following services:

   a. Two (2) copies of the Road Surface Management System (RSMS) software were provided to various municipalities. The RSMS software was also provided to 21 state transportation agency employees and 34 municipal employees from 22 towns and cities at the “Principles of a Road Maintenance Management System for Local Agencies” workshops.

   b. Six (6) copies of the Sign Inventory Management System (SIMS) software were provided to various municipalities.

   c. One (1) copy of the Municipal Equipment Management System (MEMS) software was provided to a municipality.

8. Agreements:

   a. Completed processing of a Fifteenth Amendment Agreement [Agreement No. 11.27-02(02)] with the University of Connecticut to provide administrative, fiscal and technical management of the research program of the New England Transportation Consortium (NETC) for CY03.

Technology Transfer Center (continued)

b. Completed processing of a Sixteenth Amendment Agreement [Agreement No. 1.21-02(03)] with the University of Connecticut to continue the operations of the Technology Transfer Center at the University of Connecticut for CY03.

9. The new Road Scholar Program was introduced. The first workshop in this new certificate program was held in October 2002.

10. J. Hudson attended the National LTAP Conference and participated in the first poster session that has been held during an LTAP national meeting. John provided a demonstration of Photolog Applications for Local Roads.

11. The 2002 Connecticut Road Master and Legal Traffic Authority Graduation Ceremony was held on September 12, 2002. There were Thirty-Eight (38) Road Master graduates and Fifteen (15) Legal Traffic Authority graduates.

12. Connecticut Transportation Institute researchers have begun their task of developing ways to aid in the implementation of ConnDOT sponsored research results on a local and national level.

13. The Technology Transfer Center entered into a partnership with the Office of Domestic Preparedness and Texas A&M to present the “Terrorism/Weapons of Mass Destruction” workshops. This partnership gives the Technology Transfer Center the ability to establish itself as a future training resource on Homeland Security to municipal staff in Connecticut.

14. The Technology Transfer Center entered into a partnership with the Connecticut Department of Public Health to present the “Design for Pedestrians and Bicycles in Connecticut” workshop that was held on June 10, 2003.

15. The Technology Transfer Center was represented on the Curriculum Subcommittee for the LTAP 101 Session at the 2003 National LTAP Conference.

16. CAP Lab staff began work on the upcoming Road Scholar Workshop “Roundtable Discussion on Advanced Asphalt Topics.” The CAP Lab Director also participated in the Circuit Rider program by meeting with four towns in Connecticut to address their specific pavement related issues.

17. Work has begun on a PowerPoint presentation on photolog technology and its applications.

18. Continued planning activities on the RAC Conference to be held in 2004.

19. Continued planning activities for the upcoming 2003 Construction Career Days to be held on October 7 and 8, 2003.

20. Continued planning activities for the upcoming 2003 Connecticut Technology Transfer Expo.

HPR-1417

Friction Testing and Safety Evaluation Services

OBJECTIVE

To provide friction testing and roadway safety evaluation services to ConnDOT Offices and Connecticut Municipalities upon request, in order to ensure that all roadway surfaces owned or maintained by this Department provide an acceptable level of surface friction.

PROJECT WORK STATUS

Project Started - July 1, 1990

Project Status - Active

Work Done - July 1, 2002 - June 30, 2003

1. Performed friction testing at approximately ten (10) locations in response to requests from ConnDOT offices and Municipal officials.

2. Prepared and planned for bi-annual calibration at TRC of Ohio, Inc., scheduled for October 2003.

REPORTS

None

(Memoranda containing friction test results were provided to requesting parties.)

(A report on calibration results was received from TRC of Ohio following the calibration last performed there in October 2001.)

Connecticut Cooperative Highway Research Program
with the
University of Connecticut

In 1962, the Connecticut State Legislature established a continuing joint highway research program between the Connecticut Department of Transportation (Department) and the University of Connecticut (UConn). Section 13a-256 of the General Statutes, as amended, provides for continuing funding of this research program. The continuing agreement between the Department and UConn created the eight-member Joint Highway Research Advisory Council (JHRAC or Council) with complete authority over the research program. The Council consists of four members designated by the Commissioner of Transportation and four members designated by the President of the University of Connecticut.

The University maintains an informational Web site for the Connecticut Cooperative Highway Research Program through its Connecticut Transportation Institute (http://www.cti.uconn.edu/ti/Research/crp_home.htm). You may freely view the site to learn about transportation research conducted under this research program. Research write-ups explain the scope of work and progress to date for each project. They are generally updated annually, and contain links to the principal investigators at the University.

TRANSPORTATION RESEARCH GOALS (Revised by Council, September 19, 1972)

Whereas the State of Connecticut is committed to create, maintain and operate a viable, safe and economical, transportation system in the State, and,

Whereas the Joint Highway Research Advisory Council is authorized, under the "Agreement for a Continuing Cooperative Highway Research Program to be undertaken by the Connecticut Highway Department and the University of Connecticut," to provide technical facilities and professional services to accomplish this commitment; the Council adopts the following goals:

1. To improve and facilitate the movement of goods and services on the state system.
2. To introduce improved materials and methods of operation for the design, construction, maintenance, and management of the state system.
3. To increase the safety and convenience of the state system for the people of this state, and
4. To minimize any undesirable environmental impact of existing and proposed transportation facilities on adjacent properties and communities.

Identifying, evaluating and researching transportation related problems shall achieve these goals. The results of various research projects are to be disseminated and implemented to effect beneficial changes in the State Transportation System.

PROJECT WORK STATUS

Project Started - July 9, 1962

Project Status - Active

Work Done - July 1, 2002 - June 30, 2003

1. Developed and conducted a program of transportation research. Projects are listed in PART N, "Listing of Connecticut Cooperative Highway Research Program Projects," of this publication.

REPORTS

Listed in Council's annual 'Summary of Activities' publication and at the research program's Web Site, http://www.cti.uconn.edu/ti/Research/crp_letter.htm. The most recent reports are available online through the National Transportation Library (http://ntl.bts.gov).

R.P. 175-211

Evaluation of New Products, Materials and Processes

OBJECTIVES

The Department shall, through research, assure that new and innovative materials, products and methods which offer cost-effective improvements and solutions to Department needs or problems are evaluated for merit.

PROJECT WORK STATUS

Project Started - July 1969

Project Status - Active

Work Done - July 1, 2002 - June 30, 2003

1. Product evaluation efforts have continued during FY01. Product Evaluation forms were sent out in response to inquiries for 22 products. 14 products were submitted for review. Four meetings of the Research Liaison Committee were held during FY02, to review new products. 12 product items were acted upon.

2. Continued liaison with industrial representatives. Attended demonstrations and film presentations concerning new products, materials and methods.

3. Replied to product inquiries and surveys from Federal and State Agencies.

4. Assembled information on new products for presentation to the Research Liaison Committee. Kept product files for reference purposes.

5. Arranged for Laboratory and field investigations of pavement preservative and repair items, concrete strengthening and repair items, traffic and traffic safety items, bridge expansion joints, and maintenance items.

6. Was not able to attend the 2003 Annual AASHTO-NTPEP Oversight Committee Meeting on May 17-21, 2002 in San Diego, California for represent ConnDOT and enhance knowledge of product evaluation on a national level. Travel ban initiated by the Governor’s Office due to budget issues is still in effect.

7. Due to recent retirements, two new replacement members have been appointed to the Research Liaison Committee. Vincent A. Avino (Office of Traffic Engineering) and Daniel Watson (Office of Engineering) have been replaced by Charles S. Harlow and Daniel A. Gladowski respectively.

8. Revised, updated and published the annual “Product Status List (PSL) for Connecticut Department of Transportation Projects” for publication in August 2003 for the 2002/2003 construction season.

9. The Research Liaison Committee officially changed the title of the “Product Status List (PSL) for Connecticut Department of Transportation Projects” to “Qualified Product List (QPL) for Connecticut Department of Transportation Projects.”

10. Participation continues in AASHTO’s APEL/Approved Product Evaluation Listing national web site. APEL aids by providing product information status from the other state DOT’s. This information ConnDOT utilized regularly for product evaluation reviews.

11. Continued limited development of “Product Evaluation Data Storage and Retrieval System” database with Darrell Smith (Systems Developer 1). Due to budgetary constraints and personnel changes, work has ceased and a completion date has not been yet identified. When completed, the new “Product Evaluation Data Storage and Retrieval System” program will store and maintain all pertinent data relating to Product Evaluation.

12. Initiated one (1) write up of a FHWA Experimental Features “Category 2” work plan. The work Plan is to investigate the benefits of recessing 3M’s brand of liquid and tape pavement markers.

13. Initiated a review of ConnDOT’s Policy on Product Evaluation. Current policies, procedures, and forms are to be reviewed and needed changes/updates to be made accordingly.

14. It is anticipated that a new Product Evaluation Policy and Procedure Handbook to be developed. A handbook would be a one source that handles, explains and informs on ConnDOT’s Product Evaluation Policy and Procedure.

15. Participating in beta testing of AASHTO’s NTPEP Data Mine Program. NTPEP Data Mine is a new online engineering tool used for querying and analyzing current and past NTPEP evaluations. The Data Mine Program includes features for graphical presentation of results. It is anticipated that use of the Data Mine Program and its ease of data analysis will foster further commitment to NTPEP by State DOT’s.

REPORTS

Research Liaison Committee, “Product Use Status Lists for Connecticut Department of Transportation Projects,” Report No. 211-1-92-10, June 1992.

Research Liaison Committee, "Product Use Status Lists for Connecticut Department of Transportation Projects," Report No. 211-2-94-7, May 1994.

Research Liaison Committee, “Product Use Status Lists for Connecticut Department of Transportation Projects,” Report No. 211-3-95-6, August 1995.

Research Liaison Committee, “Product Use Status Lists for Connecticut Department of Transportation Projects,” Report No. 211-4-96-9, June 1996.

Research Liaison Committee, "Product Use Status Lists for Connecticut Department of Transportation Projects," Report No. 211-5-97-3, June 1997.

Research Liaison Committee, “Product Use Status Lists for Connecticut Department of Transportation Projects,” Report No. 211-6-98-5, June 1998.

Research Liaison Committee, “Product Status Lists for Connecticut Department of Transportation Projects,” Report No. 211-7-99-4, March 1999.

Research Liaison Committee, “Product Status Lists for Connecticut Department of Transportation Projects,” Report No. 211-8-00-2, July 2000.

Research Liaison Committee, “Product Status Lists for Connecticut Department of Transportation Projects,” Report No. 211-9-01-8, August 2001.

Research Liaison Committee, “Product Status Lists for Connecticut Department of Transportation Projects,” Report No. 211-10-02-3, June 2002.

Photologging of the Connecticut State Highway System

OBJECTIVE

To Photolog the entire state highway system annually; maintain photolog systems and related data elements current for the Department.

PROJECT WORK STATUS

Project Started - May 1986

Project Status - Active

Work Done - July 1, 2002 to June 30, 2003

1. The entire state-maintained roadway network containing 6150 route kilometers (12,300 photolog kilometers) was photologged at .01 kilometer intervals using two Automatic Road Analyzer (ARAN) systems. ARAN 5 is equipped with forward and side-pointing progressive scan digital video cameras, a downward-pointing pavement imaging system called WISECRAX and the following data modules: Geographic Positioning System (GPS); roadway geometrics (horizontal and vertical curvature, grade and crossfall); rutting and roughness (IRI). ARAN 6 is equipped with a Geographic Positioning System (GPS); roadway geometrics; forward-pointing digital video camera, a WISECRAX pavement imaging system and IRI roughness module.

2. Approximately 1.2 million photolog images were transferred to 13 single-sided photolog digital versatile discs (DVD) (500 copies each). DVDs were indexed, videolinked and distributed to 450 DVD/LAN/PLV photolog retrieval stations. Network roughness (IRI), and curves and grade were forwarded to the Planning, Inventory and Data Division for HPMS submittal. WISECRAX pavement images and network roughness (IRI) were forwarded to Pavement Management.

3. Installed and/or upgraded 450 DVD/PLV retrieval stations to replace older PLV stations and fulfill new requests.

4. The Division of Research completed development of a prototype module to measure the vertical underclearance of bridges.

7. Monitored DVD/PLV library usage and determined estimated cost savings through usage documentation. Also, ascertained user and prospective-user needs, as well as provided on-site familiarization, and maintenance of second-generation photolog and PLV technology, as required.

8. Provided 400 photolog videoprints and 22 VHS videotapes for purposes of litigation, as requested.

REPORTS

Products of this activity are: the 13 current-year DVD videodiscs, which contain forward and side facing imagery of the State Highway System; databases of engineering parameters from photolog-system instrumentation; WISECRAX pavement condition images; and, DVD/PLV-image videoprints.

Part D

Implementation of Research Results During FY02/03

Below are summarized, by project, the research results which have been incorporated into Department operations and/or policy.

HPR-343, "IMPLEMENTATION OF RESEARCH FINDINGS"

Internet World Wide Web pages were updated to disseminate information about the Department's program of transportation research, product evaluation and highway photologging. The URL for Connecticut's Division of Research is http://www.dot.state.ct.us/1103/index.html, which will become http://www.ct.gov/dot/research/index.html. Research highlights are reported at http://www.dot.state.ct.us/1103/RAC.htm, which will become http://www.ct.gov/dot/research/rac.htm in FY04.

An unspecified number of ConnDOT research reports in Acrobat PDF were e-mailed upon request and downloaded free of charge from the ConnDOT and National Transportation Library Web sites. A URL for free on-line research reports was established at http://www.dot.state.ct.us/1103/Online-Report-links.htm, which will become http://www.ct.gov/research/online-report-links.htm in FY04. Approximately 11 ConnDOT Research technical reports were provided in hardcopy to other governmental agencies and companies upon request. An unknown number of additional ConnDOT research reports were downloaded from Department TRIS, and NTL Web sites. Personnel in Research and the ConnDOT Library performed more than 46 TRIS literature searches. In addition, an unspecified number of ConnDOT personnel freely accessed the Internet On-line TRIS literature-search facility and ran searches themselves. The Research library received approximately 323 new publications during the year. ConnDOT Research coordinated and responded to over 75 surveys and questionnaires from other organizations. An unspecified additional number of email questions received via listservs were also responded to or forwarded to appropriate units for response.

HPR-1213, "SHRP COORDINATION"

Completed final report and received FHWA approval for publication. Prepared paper entitled, "Connecticut's Experience with SHRP: A Retrospective," for the Transportation Research Board 2004 Meeting.

HPR-1271, "TECHNOLOGY TRANSFER CENTER"

Center personnel provided approximately 138 publications, 26 videotapes and 15 software packages, in response to 138 requests to people from local government agencies, Universities, State government agencies, federal government agencies, consultants, contractors and private citizens. In addition, 4,454 publications and 55 software packages were distributed at training programs.

Forty-six (46) workshops on twenty-one (21) topics sponsored by the T^2 Center were well-attended (3,515 individuals). Details are presented in the summary for HPR-1271. A newsletter is distributed to a mailing list of 4,238 names.

SPR-2108, "LTPP Coordination in Connecticut"

Provided input from the experiences at the Connecticut Department of Transportation to the National LTPP Program through the LTPP Expert Task Group on Traffic Data. Conducted the LTPP smoothness Specification for WIM at the Lebanon test site.

SPR-2216, “350 CRASH TESTING OF CONNECTICUT IMPACT-ATTENUATION SYSTEMS’

The draft NCIAS Crash Test Summary Report was submitted to the Federal Highway Administration (FHWA) for review.

Preparation of the draft CIAS Crash Test Summary Report was initiated.

Fabrication plans and technical advice were provided for the safe, economical Connecticut Truck Mounted Attenuator to Louisiana DOT and to a Texas road builder.

SPR-2217, “Bridge Monitoring Network in Connecticut”

Problems with excessive pigeon droppings inside the steel box-girder bridge (Flyover) in Hartford were resolved in the summer of 2001 after maintenance hired a contractor to remove all debris that had accumulated from the pigeons nesting. Installation of the bridge monitoring instruments began in July 2001, and by October 2001 the entire system has been installed. A minor problem with the software had to be worked out and data was being collected in real time on October 24, 2001.

Temporary monitoring of an in-service railroad bridge was also conducted to determine the live load capacity of the structure. To do this, 360 strain gages were used and 70 data sets of various trains were collected. The data was then given to a consultant performing an in-depth inspection of the bridge for the Office of Rails.

Installation of strain gages for the 7th bridge was also done during the months of February–April 2002. Additional gages will be installed in closure pours when the prestressed post-tensioned concrete I-beams are field spliced. This work is scheduled for July-August 2002.

Planning of systems for other sites has been investigated, and purchase of equipment is anticipated for July 2002. These sites include a bridge in Middletown and another in Cromwell.

SPR-2219, “Demonstration and Evaluation of Superpave Technologies”

During 1997, six two-mile sections of pavement were designed and placed on Route 2 in Colchester, Lebanon and Bozrah: two control class-1 mixes (one with recycling pavement); and four Superpave mixes (two with recycled pavement). These sites were monitored for performance for five years. Traffic loads are measured continuously with a weigh-in-motion system. The LTPP regional contractor periodically performs tests on deflections, roughness and distress. All test results are submitted to FHWA LTPP for entry into DataPave national database. Findings from the five-year evaluation were published in a final report.

The Department continues on the path to full implementation of Superpave. All limited access highways and all projects involving at least 5,000 tons of hot-mix asphalt pavement must use Superpave specifications.

SPR-2229, “Application of Infrared Thermographic Imaging to Bituminous Concrete Pavements”

Field data collection and review of 40 paving projects conducted during 2003. It was found that the use of remixing material transfer devices minimizes temperature differentials and aggregate segregation during laydown. The infrared camera can be used during paving operations to identify temperature variations that will likely lead to segregation and low density, and eventual premature deterioration.

SPR-2231, “Feasibility of Streaming Media for Transportation Research and Implementation”

During the course of fiscal year 2002, a server was installed for demonstrating streaming media, created using “Producer for power point 2002 ™,” as well as other Windows™ media. This software has provided the means to create high quality streaming media presentations. Affordable digital-video (DV) cameras and fire wire integrate seamlessly with Producer by synchronizing a “talking head” video to a PowerPoint presentation.

Macromedia’s Flash MX has proven invaluable in creating brief yet informative “shorts” for both ongoing and completed research projects. Streaming media content was created and provided for use on ConnDOT’s PC Support/help desk Intranet web site to premiere this technology. As department staff continues to investigate the new streaming media server/content on-line, a groundswell of interest is anticipated.

SPR-2232, “Lateral Variation in Pavement Smoothness”

It was concluded from observing and measuring roughness and distress on multiple lanes of several median-divided roadways in Connecticut, that differences between lanes are not significant. This conclusion suggests that ConnDOT does not need to change the current method of photologging one lane in each direction.

SPR-2305, “Advanced Pavement Laboratory (CAP Lab) at UConn”

In the fall of 2002, the Pennsylvania Department of Transportation announced the cancellation of FHWA Pooled Fund Project No. SPR-3(056) [formerly SPR-0003(056)], “Superpave Implementation Support – The Northeast Superpave Center (NECEPT).” Pennsylvania State University had delegated certain tasks to CAP Lab; one of these tasks was the development of the Binder Technician Certification curriculum.

To address the needs of the northeast transportation governmental and industry organizations for Superpave technology research, development and training left devoid by the cancellation of FHWA Pooled Fund Project No. SPR-3(056), CAP Lab developed a proposal for FHWA Pooled Fund Project No. TPF-5(062), “Coordination of Pavement Activities in the Northeast.”

SPR-2306, “Installation and Evaluation of WIM Utilizing Quartz-Piezo Sensor Technology

ConnDOT responded to numerous inquiries by other states, universities and industry. Data sets were shared with other interested parties for their analyses and evaluations including: University of Illinois at Champaign; Laboratoire Central Des Ponts Et Chaussées. Shared data quality analyses with other states and researchers. Presented project information to members of the University of Connecticut, Transportation Research Board and ConnDOT Planning Inventory and Data Section.

PHOTOLOGGING

ConnDOT personnel continue to utilize state-of-the-art data collection techniques in its annual pass over the state-maintained highway network. Two state-of-the-art Photolog vehicles capture forward, side and downward views of the roadway and its surroundings, using progressive scan digital-video cameras.

With the successful implementation of digital versatile disc (DVD) (developed under Project No. SPR-2224), laser-videodiscs are no longer utilized at ConnDOT for the storage and retrieval of Photolog images. In addition to DVD-based Photolog, key operational areas may now efficiently access the new digital image format via strategically located DigitalHIWAY Photolog servers. Data Services personnel continue to provide in-house pre-mastering, further reducing disc production cost. This has provided the means to broaden the accessibility of this technology throughout the Department.

Photologged all state-maintained roadways at .01 km intervals and produced 13 Digital Versatile Discs (DVD). Deployed 2002 photolog images and data with index software called DigitalHIWAY to 450 Photolog Laser Videodisc/DVD workstations for Department and other state agency use. Currently 40% of DigitalHIWAY workstations access images through ConnDOT’s Intranet.

Forwarded network level WISECRAX (pavement distress) and IRI roughness data to the Pavement Management unit, and IRI, curve and grade data to the Division of Planning Inventory and Data for inclusion in the Department’s HPMS submittal. Provided current and archive images to the legal community upon request.

PART E

Completed, Discontinued or Reassigned Projects and Items in 2002-2003

Refer to Part A for details on projects, and Parts H, I and J for published report references.

SPR-2232 – Lateral Variation in Pavement Smoothness

Closed

PART F
ConnDOT Participation in FHWA Cooperative and Pooled Funds Research Projects

POOLED FUNDS PROJECT – SPR-2(146)

"Testing of Roadside Safety Systems"

Objective(s)

To qualify the patented Connecticut Truck-Mounted Attenuator (CTMA), Connecticut Impact Attenuation System (CIAS), Narrow Connecticut Impact Attenuation System (NCIAS), and Merritt Parkway Guiderail (MPG) under new and more stringent performance criteria delineated in NCHRP Report 350.

Lead Organization – Federal Highway Administration.

Contractor(s) - Texas Transportation Institute, through Texas A&M Research Foundation.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY95 Funding	$136,000	11/15/94 [$36,000] and 6/23/95 [$100,000]	$136,000	1/17/95 [$36,000] and 6/23/95 [$100,000]
FY96 Funding	$130,000	8/1/95	$130,000	8/1/95
FY97 Funding	$100,000	5/8/97	$100,000	5/29/97

Project Status – Active

Note(s) – Formerly HPR-0002(146).

POOLED FUNDS PROJECT - SPR-2(172)

"Aerial Platform System for Bridge Inspection (Phase II)”

Objective(s)

To enhance stability characteristics of an aerial vehicle, equipped with a vision sensing system to inspect fracture-critical bridges, through the development of an integrated arm that is capable of attaching to a structure and with the addition of proximity sensors and air speed indicators to integrate with the computer controls.

Lead Organization – Federal Highway Administration.

Contractor(s) – California Department of Transportation (CALTRANS).

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY94 Funding	$ 5,000	7/23/93	$ 5,000	4/25/94
FY95 Funding	$ 5,000	7/23/93	$ 5,000	10/11/94

Project Status – Active

Note(s) – Formerly SPR-0002(172).

ConnDOT Participation in FHWA Cooperative and Pooled Funds Research Projects

POOLED FUNDS PROJECT - SPR-2(176)

"Validation of SHRP Asphalt and Asphalt Mixture Specifications Using Accelerated Loading"

Objective(s)

To validate new SHRP Specifications for asphalt paving binders and mixtures using an accelerated testing system (ATS).

Lead Organization – Federal Highway Administration.

Contractor(s) – Purdue University.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY94 Funding	$ 5,000	7/23/93	$ 5,000	4/25/94
FY95 Funding	$ 5,000	7/23/93	$ 5,000	10/11/94

Project Status – Completed.

Note(s) – Formerly SPR-0002(176).

POOLED FUNDS PROJECT - SPR-2(181)

"National Vehicle Detector Test Center"

Objective(s)

To 1) develop the appropriate test methods for each type of equipment; 2) establish the testing practices to be used; 3) develop a plan to make the facility self-supporting within three to five years; and, 4) support activities for proof of concept during start-up period.

Lead Organization – Federal Highway Administration.

Contractor(s) – Southwest Technology Development Institute at New Mexico State University.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY95 Funding	$ 5,000	8/12/94	$ 5,000	2/16/95
FY96 Funding	$ 5,000	8/12/94	$ 5,000	2/21/96

Project Status - Active

Note(s) - Formerly SPR-0002(181).

POOLED FUNDS PROJECT - SPR-2(182)

"Development and Validation of Traffic Data Editing Procedures (TDEP)"

Objective(s)

To develop automated editing procedures for traffic counting, Automatic Vehicle Classification (AVC) and Weigh-in-Motion (WIM) activities. The products will include software for identifying questionable/invalid data. Processing the edited (acceptable) data and appropriate reporting of processed data.

Lead Organization – Federal Highway Administration.

Contractor(s) – Intelligent Decision Technologies, Ltd.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY95 Funding	$ 5,000	8/12/94	$ 5,000	2/16/95
FY96 Funding	$ 5,000	8/12/94	$ 5,000	2/21/96

Project Status – Completed.

Note(s) – Formerly SPR-0002(182).

POOLED FUNDS PROJECT - SPR-2(184)

"Long Term Monitoring of Mitigating Corrosion Measures"

Objective(s)

To evaluate the performance of corrosion inhibitors for reinforced concrete by long-term monitoring of full-scale structures and exposure slabs.

Lead Organization – Federal Highway Administration.

Contractor(s) – Virginia Transportation Research Council (VTRC).

Connecticut initiated the project, prepared the Scope of Work, and is designated as the lead state for the project. Field test sites and inhibitor installations may also be provided for the study. Monetary pledges from Connecticut have not been required to date.

Project Status - Active

Note(s) - Formerly SPR-0002(184), "Field Evaluation of Corrosion Inhibitors for Concrete."

POOLED FUNDS PROJECT - SPR-2(199)

"Optimal Acceptance Procedures for Statistical Construction Specifications"

Objective(s)

1. To develop statistical acceptance procedures that are based on sound scientific and mathematical principles.
2. To make this information rationally comprehensible to the many users in the transportation field.
3. To widely disseminate this information in the form of an easily understood reference manual.

Lead Organization – Federal Highway Administration.

Contractor(s) – Clemson University.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY98 Funding	$ 5,000	2/23/98	$ 5,000	8/27/98
FY99 Funding	$ 5,000	2/23/98	$ 5,000	12/8/98

Project Status – Active

Note(s) - Formerly SPR-0002(199).

POOLED FUNDS PROJECT - SPR-2(203)

"Truck/Pavement Economic Modeling and In-Situ Field Testing Data Analysis Applications"

Objective(s)

To merge and analyze dynamic response data obtained on full-scale pavement facilities for the purpose of determining how various design features and truck configurations affect pavement performance.

Lead Organization – Federal Highway Administration.

Contractor(s) – Ohio Department of Transportation and Federal Highway Administration.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY00 Funding	$ 5,000	6/30/99	$ 5,000	10/25/99
FY01 Funding	$ 5,000	6/30/99	$ 5,000	12/5/00

Project Status – Active

Note(s) – Formerly SPR-0002(203).

POOLED FUNDS PROJECT - SPR-2(207)

"Transportation Management Center Pooled Fund Study (TMS PFS)"

Objective(s)

To assemble a consortium composed of regional, State, and local traffic management agencies, and the FHWA to (1) identify human-centered and operational issues that are common among TMC operators and managers; (2) suggest approaches to addressing identified problems; (3) initiate and monitor projects intended to address identified problems; (4) disseminate results; and (5) assist in solution deployment.

Lead Organization – Federal Highway Administration.

Contractor(s) – PB Farradyne, Texas Transportation Institute, University of Virginia and MRF Associates.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY00 Funding	$ 5,000	8/23/99	$ 5,000	3/8/00
FY01 Funding	$ 5,000	8/23/99	$ 5,000	12/5/00
FY02 Funding	$10,000	5/16/01	$10,000	10/29/01
FY03 Funding	$10,000	11/26/01	$10,000	10/10/02
FY04 Funding	$10,000	11/26/01		
FY05 Funding	$10,000	11/26/01		

Project Status – Active

Note(s) - Formerly SPR-0002(207).

POOLED FUNDS PROJECT - SPR-2(208)

"Pavement Subgrade Performance Study"

Objective(s)

To develop improved mechanistic subgrade criteria for pavements and to integrate the study findings into improved mechanistic-empirical design methodologies for new and reconstructed flexible pavements.

Lead Organization – Federal Highway Administration.

Contractor(s) – Cold Regions Research and Engineering Laboratory (CRREL).

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY00 Funding	$ 5,000	10/26/99	$ 5,000	5/3/00
FY01 Funding	$ 5,000	10/26/99	$ 5,000	12/5/00
FY03 Funding	$ 5,000	3/13/03	$ 5,000	3/31/03

Project Status – Active

Note(s) - Formerly SPR-0002(208).

POOLED FUNDS PROJECT - SPR-2(211)

"Bulk Specific Gravity Round Robin Using the Corelok Vacuum Sealing Device"

Objective(s)

To determine the accuracy, precision and bias of measuring bulk specific gravity of compacted hot-mix asphalt samples when using the Corelok Vacuum-sealing device.

Lead Organization – Federal Highway Administration.

Contractor(s) – National Center for Asphalt Technology (NCAT).

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY00 Funding	$10,000	4/17/00	$10,000	5/24/00

Project Status – Active

Note(s) – Formerly SPR-0002(211).

POOLED FUNDS PROJECT - SPR-2(800)

"SHRP Implementation of Asphalt Test Equipment"

Objective(s)

To purchase asphalt-test equipment and deliver to participating states for use with evaluation of performance-based asphalt specifications developed by SHRP. Early use of the test methods, specifications and equipment will aid in AASHTO adoption of "Superpave" standards. (Superpave combines new tests, performance-based specifications and a computerized mix design process.)

Lead Organization – Federal Highway Administration.

Contractor(s) – Federal Highway Administration (FHWA) Office of Technology Applications.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY92 Funding	$ 10,000	3/18/92	$ 10,000	3/17/92
FY95 Funding	$260,000 [1]	-	$260,000	-
FY97 Funding	($70,000)[2]	5/1/97	($70,000)	5/1/97

[1] $260,000 was transferred from STPA 000S(680) to SPR-2(800).

[2] $70,000 was transferred from SPR-2(800), “SHRP Implementation of Asphalt Test Equipment,” to SPR-3(029), “New England Transportation Consortium (NETC): FY 1995 to FY 1999,” on 5/1/97.

Project Status – Active

Note(s) – Formerly HPR-0002(800).

POOLED FUNDS PROJECT - SPR-3(017)

"Midwest States Pooled Fund Crash Test Program"

Objective(s)

To crash test bridge rail, guardrail, sign supports as well as other highway appurtenances and traffic control devices having potential for injury to highway users.

Lead Organization – Nebraska Department of Transportation.

Contractor(s) – University of Nebraska.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY00 Funding	$ 5,000	7/13/99	$ 5,000	10/25/99
FY01 Funding	$ 5,000	7/13/99	$ 5,000	12/5/00
FY02 Funding	$ 5,000	7/16/01	$ 5,000	10/29/01
FY03 Funding	$ 5,000	7/16/01	$ 5,000	10/2/02
FY04 Funding	$ 5,000	6/11/03		

Project Status – Active

Note(s) - Formerly SPR-0003(017). Pooled Fund Project HPR-2(164), “Development of a Thrie Beam Bullnose Median Barrier Terminal,” has been incorporated into Pooled Funds Project SPR-3(017).

POOLED FUNDS PROJECT - SPR-3(022)

"Tidal and Coastal Hydraulics – Phases 1, 2 & 3"

Objective(s)

To develop a computer model or models for use by Highway Hydraulic Engineers to analyze highway encroachments in tidal waters.

Lead Organization – North Carolina Department of Transportation.

Contractor(s) - Resource Consultants and Engineering, Inc.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY93 Funding	$ 5,000	2/1/93	$ 5,000	9/10/93
FY94 Funding	$ 5,000	2/1/93	$ 5,000	12/6/93
FY98 Funding	$10,000	9/8/98	$10,000	9/8/98

Project Status – Active

Note(s) – Formerly SPR-0003(022).

POOLED FUNDS PROJECT - SPR-3(029)

"New England Transportation Consortium (NETC): FY 1995 to FY 1999"

Objective(s)

Implementation of a three-pronged program for the New England region consisting of research and development; technology transfer; and, education and training.

Development of improved methods for dealing with common transportation problems.

Providing an important source of trained professionals for employment in the Region.

Lead Organization – Connecticut Department of Transportation.

Contractor(s) – University of Connecticut.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY95 Funding	$ 75,000	11/10/94	$ 75,000	10/21/94
FY96 Funding [1]	$ 63,833	12/6/95 [$75,000] and [($11,167)] 10/3/97	$ 63,833	12/6/95 [$75,000] and [($11,167)] 10/3/97
FY97 Funding	$145,000	12/6/96 [$75,000] and 5/1/97 [$70,000] [2]	$145,000	12/6/96 [$75,000] and 5/1/97 [$70,000] [2]
FY98 Funding	$ 75,000	2/23/98	$ 75,000	8/27/98
FY99 Funding	$ 75,000	12/8/98	$ 75,000	12/8/98

[1] FY96 Pledge and Obligation reduced by $11,167, from $75,000 to $63,8333, requested on 10/3/97 and approved on 10/9/97, for transfer from SPR-3(029), "New England Transportation Consortium (NETC): FY 1995 to FY 1999," to SPR-3(052), "Procedures for the Evaluation of Sheet Membrane Waterproofing."

[2] $70,000 was transferred from SPR-2(800), "SHRP Implementation of Asphalt Test Equipment," to SPR-3(029), "New England Transportation Consortium (NETC): FY 1995 to FY 1999," on 5/1/97.

Project Status – Active

Note(s) - Formerly SPR-0003(029).

POOLED FUNDS PROJECT - SPR-3(031)

"Reusable Truck Mounted Attenuator"

Objective(s)

To design and successfully crash test a Test Level 3 (100 km/h) Truck Mounted Attenuator (TMA) in which energy is dissipated with HMW/HDPE cylinders that will be self restoring and reusable. The crash testing program is to be conducted in accordance with the requirements of "NCHRP Report 350."

Lead Organization – Washington Department of Transportation.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY96 Funding	$10,000	4/29/96	$10,000	4/29/96
FY97 Funding	$10,000	12/17/96	$10,000	12/17/96

Project Status – Active

Note(s) - Formerly SPR-0003(031).

POOLED FUNDS PROJECT - SPR-3(035)

"Travel Model Improvement Program"

Objective(s)

To develop improved travel forecasting procedures to help states and Metropolitan Planning Organizations (MPO's) satisfy Intermodal Surface Transportation Efficiency Act (ISTEA) and Clean Air Act requirements.

Lead Organization – Maryland Department of Transportation.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY96 Funding	$10,000 [1]	11/15/95	$10,000	12/6/95
FY97 Funding	$10,000 [1]	11/15/95	$10,000	12/6/95

[1] Funding provided from Planning portion of SPR.

Project Status - Active

Note(s) - Formerly SPR-0003(035).

POOLED FUNDS PROJECT – SPR-3(043)

"Development of a New Guardrail End Treatment – Phase II"

Objective(s)

To develop a new safety-compliant guardrail end treatment in light of current FHWA policy.

Lead Organization – California Department of Transportation (CALTRANS)

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY98 Funding	$ 5,000	10/3/97	$ 5,000	8/28/98
FY99 Funding	$ 5,000	10/3/97	$ 5,000	12/8/98

Project Status – Active

Note(s) - Formerly SPR-0003(043).

POOLED FUNDS PROJECT – SPR-3(050)

"New England Traffic Monitoring System"

Objective(s)

To enable the New England states to share traffic data, particularly vehicle classification and truck weight data, by obtaining a traffic monitoring system that would be uniform in its data formatting, editing and storage functions while enabling each state to analyze the data and produce reports from the data that fulfill state requirements.

Lead Organization – Vermont Department of Transportation.

Contractor(s) – GIS Trans.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY97 Funding [1]	$95,000	-	$95,000	-

[1] Funding was provided from Planning portion of SPR. FY97 funds were pledged and obligated under Pooled-fund Project No. STPZ-0003(050).

Project Status – Active

Note(s) - Formerly SPR-0003(050).

POOLED FUNDS PROJECT – SPR-3(056)

"Superpave Implementation Support – The Northeast Superpave Center (NECEPT)"

Objective(s)

To provide Superpave training and implementation support over five years.

Lead Organization – Pennsylvania Department of Transportation.

Contractor(s) – Pennsylvania State University.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
Year 1 Funding	$19,040 [1]	3/16/98	$19,040 [2]	-
Year 2 Funding	$16,040 [1]	3/16/98	$16,044 [3]	-
Year 3 Funding	$16,040 [1]	3/16/98	$16,044 [4]	-
Year 4 Funding	$16,040 [1]	3/16/98		
Year 5 Funding	$16,040 [1]	3/16/98		

[1] Funding will be provided from sources other than SPR. Funding provided is 100% State funds (State Project No. 706-210 170-1800). Project had a one-year delay in initiation.

[2] Provided in-kind support for Year 1 through the Connecticut Advanced Pavement Laboratory (CAP Lab) Agreement for tasks delegated to the University of Connecticut by the Pennsylvania State University for the development of the Binder Technician Certification curriculum and other tasks. Year 1 funds were from FY99.

[3] Provided in-kind support for Year 2 through the Connecticut Advanced Pavement Laboratory (CAP Lab) 5th Amendment Agreement [Agreement No. 6.06-01(00)] for tasks delegated to the University of Connecticut by the Pennsylvania State University for the development of the Binder Technician Certification curriculum and other tasks. In the fall of 2002, the Pennsylvania Department of Transportation announced the cancellation of the project at the end of the Year 2 Work Program.

[4] Provided in-kind support for Year 3 through the Connecticut Advanced Pavement Laboratory (CAP Lab) 7th Amendment Agreement [Agreement No. 7.24-03(01)] for tasks delegated to the University of Connecticut by the Pennsylvania State University for the development of the Binder Technician Certification curriculum and other tasks.

Project Status – Closed

Note(s) – Formerly SPR-0003(056).

POOLED FUNDS PROJECT – SPR-3(071)

"A New Approach to Assessing Road User Charges"

Objective(s)

The purpose of this research is to design a system for charging road users that embodies as many attributes of an ideal user charge system as possible. This research will examine the use of ITS technology that will enable real-time assessment of user charges based on actual miles traveled. Key to this approach is an onboard computer linked to global positioning systems (GPS) and detailed electronic map (MIS) systems. The system will track travel and, when data is downloaded, provide a means for use-based billing.

Lead Organization – Minnesota Department of Transportation.

Contractor(s) – University of Iowa and University of Minnesota.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY03 Funding	$10,000	3/28/02	$10,000	10/2/02
FY04 Funding	$10,000	3/28/02		

Project Status – Active

Note(s) - Formerly SPR-0003(071).

POOLED FUNDS PROJECT – SPR-3(081)

"High-Speed Electromagnetic Roadway Mapping and Evaluation System (HERMES) II"

Objective(s)

To develop the second generation of a high-speed system for bridge deck condition assessment, known as High Speed Electromagnetic Roadway Measurement and Evaluation System (HERMES II), with the end goal to commercialize it, and make the technology available to all state transportation agencies around the United States.

Lead Organization – California Department of Transportation (CALTRANS).

Contractor(s) – Lawrence Livermore National Laboratory.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY00 Funding	$10,000	2/15/00	$10,000	2/29/00

Project Status – Active

Note(s) - Formerly SPR-0003(081).

POOLED FUNDS PROJECT – SPR-3(082)

"Quantifying Segregation in Hot-Mix Asphalt"

Objective(s)

To assemble a group of states to: (1) run HMA density tests using the non-nuclear PQI device; (2) gather data – dry vs. wet asphalt, use of different aggregate sources, changes in size of aggregate; (3) supply this data for analysis to the Turner-Fairbank Highway Research Center in McLean, Virginia; and, (4) to determine the viability of using the PQI device vs. the conventional nuclear density gauges.

Lead Organization – Maryland Department of Transportation.

Contractor(s) – Transtec Systems, Inc.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY99 Funding	$ 5,000	1/4/00	$ 5,000	3/7/00
FY00 Funding	$ 5,000	1/4/00	$ 5,000	3/7/00
FY03 Funding	$16,000	12/18/02	$16,000	3/14/02
FY04 Funding	$16,000	12/18/02		

Project Status – Active

Note(s) - Formerly SPR-0003(082), "Evaluation of the Next Generation Pavement Quality Indicator (PQI) Device."

POOLED FUNDS PROJECT – SPR-3(084)

"Use of Dynamic Modulus (E*) in Hot-Mix Asphalt Designs"

Objective(s)

1. To determine the applicability of Dynamic Modulus (E*) testing to characterize HMA mixes.
2. To determine the practical range of E* testing to characterize an HMA mix.
3. To determine variations in E* values as a function of aggregate type, including typical recycled materials.

Lead Organization – Connecticut Department of Transportation.

Contractor(s) – University of Connecticut.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY00 Funding	$10,000	6/19/00	$10,000	6/19/00
FY01 Funding	$35,000	12/7/00 [$60,000] and 3/14/01 [($25,000)]	$35,000	12/7/00 [$60,000] and 3/14/01 [($25,000)]

Project Status – Completed

Note(s) - Formerly SPR-0003(084).

POOLED FUNDS PROJECT – SPR-3(089)

"New England Transportation Consortium (NETC): FY2000 to Present"

Objective(s)

Implementation of a three-pronged program for the New England region consisting of research and development; technology transfer; and, education and training.

Lead Organization – Connecticut Department of Transportation.

Contractor(s) – University of Connecticut.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY00 Funding	$100,000	10/25/99	$100,000	10/25/99
FY01 Funding	$100,000	12/6/00	$100,000	12/6/00
FY02 Funding	$100,000	10/30/01	$100,000	10/30/01
FY03 Funding	$100,000	10/1/02	$100,000	10/7/02

Project Status – Active

Note(s) - Formerly SPR-0003(089).

POOLED FUNDS PROJECT – TPF-5(002)

"Updating 'A Guide to Standardized Highway Lighting Pole Hardware'"

Objective(s)

To prepare, in printed and electronic formats, an update to the 1980 "A Guide to Standardized Highway Lighting Pole Hardware," and to recommend an ongoing process for compiling, incorporating and disseminating pertinent new as updated standards and catalog information to keep the publication up to date.

Lead Organization – Wyoming Department of Transportation.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY01 Funding	$ 5,000	7/20/00	$ 5,000	12/5/00
FY02 Funding	$10,000	7/20/00	$10,000	10/29/01

Project Status - Active

Note(s) – Formerly SPR-0003(103).

POOLED FUNDS PROJECT – TPF-5(004)

"Long Term Pavement Performance (LTPP) Specific Pavements Study (SPS) Traffic Data Collection"

Objective(s)

To implement procedures, including installation of equipment and monitoring of data collection through analysis of data, improve the quality and quantity of traffic data (volumes, classifications and weights) that is collected under the auspices of the LTPP Specific Pavements Study (SPS) Program. (for LTPP SPS 1, 2, 5, 6 and 8 projects) A core objective of the SPS studies is to understand and quantify the relationship between pavement performance and truck volumes and axle loadings.

Lead Organization – Federal Highway Administration.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY01 Funding	$ 5,000	11/1/00	$ 5,000	12/5/00
FY02 Funding	$ 5,000	11/1/00	$ 5,000	10/29/01

Project Status - Active

Note(s) – Formerly SPR-0002(217), "LTPP Specific Pavements Study (SPS) Traffic Data Collection."

POOLED FUNDS PROJECT – TPF-5(008)

"Development of Computer Based Training (CBT) Lessons"

Objective(s)

To develop computer based training (CBT) lessons/courses in the various areas such as: driver safety, commercial driver licensing (CDL), basic math for road maintenance, metric fundamentals and work zone safety.

Lead Organization – Federal Highway Administration.

Contractor(s) – Work Place Training, Inc.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY95 Funding	$ 5,000	8/12/94	$ 5,000	2/16/95
FY96 Funding	$ 5,000	8/12/94	$ 5,000	2/21/96
FY99 Funding	$10,000	2/23/98	$10,000	12/8/98
FY02 Funding	$10,000	10/30/01	$10,000	10/30/01

Project Status - Active

Note(s) – Formerly SPR-0002(183). Funds obligated under SPR-0002(183).

POOLED FUNDS PROJECT – TPF-5(009)

"Computer-Based, Self-Operating Training System on Anti-Icing/Road Weather Information Systems (AI/RWIS)"

Objective(s)

Anti-icing and road weather information systems (AI/RWIS) are relatively new tools that improve the efficiency of winter storm maintenance and, as a result, improve highway safety. Because these are new concepts, standard training programs for all levels of AI/RWIS users are not yet available. The objective of this project is to coordinate and leverage several individual training and educational initiatives into one consistent training program for AI/RWIS.

Lead Organization – Iowa Department of Transportation.

Contractor(s) – GanTek.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY02 Funding	$ 5,000	11/8/01	$ 5,000	11/8/01

Project Status – Active

Note(s) – Formerly SPR-0003(104).

POOLED FUNDS PROJECT – TPF-5(010)

"Structural Improvement of Flexible Pavements Using Geosynthetics for Base Course Reinforcement"

Objective(s)

1. To determine whether geosynthetics (geogrids and geotextiles) can be used to increase the structural capacity of pavements typically constructed by state DOTs.
2. To measure in-situ stress/strain response of the reinforced material for use in current or future pavement design processes.
3. To determine whether geosynthetics can be used to increase the service life of pavements typically constructed by state DOTs.
4. To compare the performance of base course reinforced pavements subjected to traffic loading during non-frost periods with performance during thaw. Thus, the influence of thaw weakening on pavement performance will be assessed independently of the degree of traffic loading.

Lead Organization – Maine Department of Transportation.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY02 Funding	$ 5,000	11/7/00	$ 5,000	10/29/01
FY03 Funding	$ 5,000	11/7/00	$ 5,000	10/10/02
FY04 Funding	$ 5,000	11/7/00		
FY05 Funding	$ 5,000	11/7/00		

Project Status - Active

Note(s) – None

POOLED FUNDS PROJECT – TPF-5(016)

"Micropile Systems for Highway Bridges"

Objective(s)

To develop national guidelines for using micropile technology to support new and/or existing structures to resist large forces, especially from extreme events such as earthquakes, ships impact and scouring from floods.

Lead Organization – Federal Highway Administration.

Contractor(s) – California Department of Transportation (CALTRANS).

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY01 Funding	$ 5,000	3/16/01	$ 5,000	6/4/01
FY02 Funding	$ 5,000	3/16/01	$ 5,000	10/30/01
FY03 Funding	$ 5,000	3/16/01	$ 5,000	10/2/02

Project Status - Active

Note(s) – None

POOLED FUNDS PROJECT – TPF-5(019)

"Full Scale Accelerated Performance Testing for Superpave and Structural Validation"

Objective(s)

This pooled fund research study will investigate a suite of emerging pavement technologies at the Turner-Fairbank Highway Research Center (TFHRC). The Pavement Testing Facility (PTF) is a permanent pavement testing laboratory equipped with two accelerated loading machines that can test various pavement configurations using controlled climate and axle loading.

The objective of this project is to study, select, build and test up to twelve (12) lanes of newly constructed pavement. This multi-task, multi-level experiment can include one or more of the following technologies:

1. Modified Asphalt Binders in Superpave Mixes
2. Pavements Designed with the 2002 Design Guide
3. Measurements Made With Various Falling Weight Deflectometers
4. Crumb Rubber Modified (CRM) Asphalt Pavements
5. Recycled Materials in Base Layers

Lead Organization – Federal Highway Administration.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY02 Funding	$10,000	10/31/01	$10,000	10/30/01

Project Status – Active

Note(s) – None

POOLED FUNDS PROJECT – TPF-5(024)

"Next Generation Retro-Reflective Beads for Traffic Paints"

Objective(s)

To develop and evaluate the performance of surface-modified polymethacrylate (PMMA) beads as a replacement to the salinized glass beads currently used to provide retroreflectivity in traffic paints.

Lead Organization – New Hampshire Department of Transportation.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY02 Funding	$20,000	1/29/01	$20,000	10/30/01

Project Status – Active

Note(s) – None

POOLED FUNDS PROJECT – TPF-5(026)

"Durability of Segmented Retaining Wall Blocks"

Objective(s)

To establish design and durability performance criteria for Segmental Retaining Wall (SRW) blocks, service evaluation and inspection guidance, and acceptance testing protocol.

Lead Organization – Federal Highway Administration

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY01 Funding	$ 5,000	11/1/00	$ 5,000	1/23/01
FY02 Funding	$ 5,000	11/1/00	$ 5,000	10/30/01

Project Status – Active

Note(s) – Formerly SPR-0002(218). Funds obligated under SPR-0002(218).

POOLED FUNDS PROJECT – TPF-5(038)

"Automated Geotechnical Information and Design System (AGIDS)"

Objective(s)

To develop improved procedures for the design and construction of bridge foundations, retaining wall systems, and other geotechnical projects through the use of internet and database technology. This study will involve the comprehensive integration of several FHWA databases and computer modules that were recently developed to allow geotechnical engineers to quickly and economically obtain information and evaluate design alternatives from a centrally located computer source.

Lead Organization – Federal Highway Administration.

Contractor(s) – Salute, Inc./ENSC.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY03 Funding	$ 5,000	4/3/02	$ 5,000	10/2/02
FY04 Funding	$ 5,000	4/3/02		

Project Status – Active

Note(s) – None

POOLED FUNDS PROJECT – TPF-5(045)

"Performance Guidelines for the Selection of Hot-Pour Crack Sealants"

Objective(s)

To facilitate management of the TCCC at the national level and for the development of curriculum and core training materials identified by the TCCC technical panel.

Lead Organization – Virginia Department of Transportation.

Contractor(s) – Virginia Polytechnic Institute and State University; and, National Research Council of Canada.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY03 Funding	$ 5,000	10/18/02	$ 5,000	10/21/02
FY04 Funding	$ 5,000	10/18/02		
FY05 Funding	$ 5,000	10/18/02		
FY06 Funding	$ 5,000	10/18/02		

Project Status – Active

Note(s) – None

POOLED FUNDS PROJECT – TPF-5(046)

"Transportation Curriculum Coordination Council (TCCC) Training Management and Development"

Objective(s)

To facilitate management of the TCCC at the national level and for the development of curriculum and core training materials identified by the TCCC technical panel.

Lead Organization – Federal Highway Administration

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY03 Funding	$15,000	4/23/02	$15,000	10/2/02
FY04 Funding	$15,000	4/23/02		
FY05 Funding	$15,000	4/23/02		
FY06 Funding	$15,000	4/23/02		

Project Status – Active

Note(s) – None

POOLED FUNDS PROJECT – TPF-5(062)

"Coordination of Pavement Activities in the Northeast"

Objective(s)

State transportation agencies in the northeastern United States are heavily involved with the implementation and use of the SuperPave method of designing hot-mix asphalt (HMA) mixtures. It has been determined that there are several unanswered issues before the full benefits of using the SuperPave system and related concepts can be totally embraced and integrated into the operations of state transportation agencies. Many issues vary regionally and to address these regional issues and other paving and pavement problems, the Federal Highway Administration (FHWA) established five centers of excellence in paving technology that were unfunded. To overcome the lack of financial resources needed to address regional pavement issues, state transportation agencies in the northeast have pooled their resources and developed a pooled funds project to provide guidance to the state transportation agencies on all current paving and pavement problems. SuperPave was its initial focus.

The specific objectives of this project are:

- Coordination of new innovative research and paving projects and related activities in the area of pavement technology on the regional level and to distribute this information to affected state transportation agencies and other agencies, including the private sector.
- Completion of various studies and evaluations.
- Upgrading and operation of a website devoted to pavement technology.
- Conducting various training and workshop efforts devoted to paving technology.

Lead Organization – Connecticut Department of Transportation.

Contractor(s) – University of Connecticut.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY03 Funding [1]	$44,000	6/3/03	$44,000	6/3/03

[1] $39,352 was pledged on 5/9/03 and an obligation request memo was sent on 5/12/03. The pledge was revised to $44,000 on 6/3/03; the pledge will be reduced by $5,000 when Delaware's FFY04 pledge is obligated. The obligation process was initiated when State Project No. 017-H091 was modified on 6/3/03.

Project Status – Active

Note(s) – None

POOLED FUNDS PROJECT – TPF-5(063)

"Improving the Quality of Pavement Profiler Measurement"

Objective(s)

This project is designed to:

- Deliver sample procurement specifications, equipment maintenance guidelines and profile analysis software.
- Establish criteria for verification centers assist with the development of these locations.
- Develop and deploy a traceable verification center.
- Provide technical review of software that:
  - o Locates surface imperfections that require corrective repair during construction.
  - o Relates the surface imperfections to the highway users.
  - o Procures for general distribution.

Lead Organization – Federal Highway Administration.

Contractor(s) – Federal Highway Administration, Midwestern Resource Center.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY03 Funding	$10,000	7/29/02	$10,000	10/7/02
FY04 Funding	$10,000	7/29/02		

Project Status – Active

Note(s) – None

POOLED FUNDS PROJECT – TPF-5(068)

"Long-Term Maintenance of Load and Resistance Factor Design Specifications"

Objective(s)

The objective of this project is to provide assistance to the AASHTO Highway Subcommittee on Bridges and Structures in interpreting, implementing, revising and refining the AASHTO Load and Resistance Factor Design (LRFD) documents.

Lead Organization – Iowa Department of Transportation.

Contractor(s) – American Association of State Highway Transportation Officials (AASHTO).

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY03 Funding	$20,000	8/02	$20,000	8/02
FY05 Funding	$20,000	8/02		

Project Status – Active

Note(s) – The 12/9/02 $10,000 pledge for FY03 and $10,000 pledge for FY05 was rescinded on 1/8/03. The initial $20,000 was paid directly to AASHTO, at the direction of Comr. James F. Byrnes, Jr., by the Director of Fiscal/Special Projects, in 8/02. Another $20,000 will be paid directly to AASHTO, by the same source at a later date.

POOLED FUNDS PROJECT – TPF-5(069)

"Core Program Services for a Highway Research, Development, and Technology Program, TRB Fiscal Year 2004"

Objective(s)

Every three years, a triennium agreement is developed among the supporting members of the TRB, including FHWA and the American Association of State and Transportation Officials (AASHTO), which outlines the TRB core program for that period and includes a 3-year budget.

The objective of this study is to provide a mechanism for State transportation departments to support the TRB's core program and services.

Lead Organization – Federal Highway Administration.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY03 Funding	$108,960	1/31/03	$108,960	1/31/03
FY04 Funding	$108,960	1/31/03		
FY05 Funding	$108,960	1/31/03		

Project Status – Active

Note(s) – None.

POOLED FUNDS PROJECT – TPF-5(073)

"Portable Non-Intrusive Technologies (PNIT)"

Objective(s)

The objective of this project is to develop and test a Portable Non-Intrusive Technology (PNIT) traffic detection system that can monitor traffic (i.e., detect traffic above or to the side of the roadway) on multi-lane, high-volume facilities without exposing personnel to traffic.

Lead Organization – Minnesota Department of Transportation.

Contractor(s) – SRF Consulting Group, Inc.

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY03 Funding	$10,000	9/6/02	$10,000	3/18/03

Project Status – Active

Note(s) – None.

POOLED FUNDS PROJECT – TPF-5(076)

"Development of Geotechnical Procedures/Operations Manual"

Objective(s)

The objective of this project is to develop a manual that provides detailed technical guidance on geotechnical procedures and selection, management, quality, and cost control of products/services from geotechnical consultants and drillers. The project will also include development of a web-enabled template with an implementation plan and a user interface application that will allow state transportation agencies to adopt the manual in a form that is most suitable to their needs.

Lead Organization – Maine Department of Transportation.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY04 Funding	$ 5,000	6/17/03		
FY05 Funding	$ 5,000	6/17/03		

Project Status – Active

Note(s) – None.

POOLED FUNDS PROJECT – TPF-5(080)

"Investigation of Low Temperature Cracking in Asphalt Pavements"

Objective(s)

The development of a fracture-mechanics-based specification is one of the objectives of this study. It will allow for a better selection of asphalt binders and mixtures with respect to their resistance to crack formation and propagation. This fracture mechanics approach will also be used to investigate the detrimental role of aging and moisture to fracture resistance of asphalt materials.

Lead Organization – Minnesota Department of Transportation.

Contractor(s) – N/A

	Pledge	Pledge Date	Obligation Request	Obligation Request Date
FY04 Funding	$ 5,000	8/27/03		
FY05 Funding	$ 5,000	8/27/03		

Project Status – Active

Note(s) – None.

PART G

Proposed Research Projects for FY03/04

TITLE: E-HIWAY: A Web-based Photolog Viewing Tool

PROJECT NUMBER: Unassigned

RESEARCH AGENCY: ConnDOT Division of Research

OBJECTIVES:

To provide a Photolog viewing and printing capability over the Internet using Microsoft's Internet Explorer 5.5 or equivalent web browser. This project would specifically address Photolog digital-image retrieval by the outside governmental agencies, the public and private sector using various means to connect to a Photolog-image Web server. Develop, also, a system for password-protected accounts and a user-order management system.

TITLE: Automated Speed-limit Sign Recognition System – Prototype System Test

PROJECT NUMBER: Unassigned

RESEARCH AGENCY: ConnDOT Division of Research

OBJECTIVES:

To test the rigorousness of a computerized image processing algorithm that detects speed limit signs from ConnDOT photolog images.

TITLE: Implementation of Lightweight Non-Contact Profilers for Use in Quality Assurance of Pavement Construction

PROJECT NUMBER: Unassigned

RESEARCH AGENCY: ConnDOT Division of Research

OBJECTIVES:

1. To obtain one Australia Road Research Board, Transport Research, Walking Profiler and one lightweight non-contact inertial profiler.

2. To develop precision and bias statements for the Walking Profiler and the lightweight non-contact profiler.

3. To recommend a certification and/or regression/correlation procedure for use in a quality assurance program for smoothness acceptance of pavement construction.

4. To recommend revisions to the Special Provision of Pavement Smoothness (Rideability).

5. To implement the use of lightweight profilers in the Quality Assurance Program.

PART G (continued)

Proposed Research Projects for FY03/04

TITLE: Feasibility of Auto-Detection Systems for the Dilemma Zone at High-Speed Isolated Intersections

PROJECT NUMBER: Unassigned

RESEARCH AGENCY: ConnDOT Division of Research

OBJECTIVES:

1. To reduce the amount of red light runners and the accidents caused by the red light runners.

2. To develop parameters for the dilemma zone.

3. To field test and evaluate auto-detection systems for the dilemma zone and other applications for high-speed isolated intersections.

TITLE: Automated 'Chain of Custody' for Materials Samples

PROJECT NUMBER: Unassigned

RESEARCH AGENCY: ConnDOT Office of Research and Materials

OBJECTIVES:

To investigate, evaluate and adapt an existing Lab Information Management System (LIMS) for use in Connecticut.

TITLE: Investigation of In-Place Permeability of Pavements in Connecticut

PROJECT NUMBER: Unassigned

RESEARCH AGENCY: ConnDOT Office of Research and Materials

OBJECTIVES:

The proposed research will determine recommendations for the design of Superpave mixtures in Connecticut that have reduced permeability. Research will address in-place permeability of both Superpave and Marshall HMA pavements in Connecticut. Comparisons will be made between the Marshall mixtures and Superpave mixtures to see what the differences are in permeability. Comparisons will also be made within the Superpave mixtures based on designed traffic levels and gradations above/below the maximum density line.

TITLE: Feasibility of Bridge WIM in Connecticut

PROJECT NUMBER: Unassigned

RESEARCH AGENCY: ConnDOT Office of Research and Materials

OBJECTIVES:

To determine if it is feasible to generate and collect Bridge WIM (BWIM) data of reasonable accuracy for transportation purposes from existing and proposed bridge monitoring installations in Connecticut.

TITLE: Just-in-Time Data for Transportation Needs

PROJECT NUMBER: Unassigned

RESEARCH AGENCY: ConnDOT Office of Research and Materials

OBJECTIVES:

To evaluate Just-In-Time (JIT) Strategies and determine the benefits of applying these methods to transportation data to provide improved efficiency and flexibility while meeting data requirements for the many new transportation needs including emergency management and security.

TITLE: Development and Implementation of Quality Assurance in Highway Construction, Phase 2

PROJECT NUMBER: Unassigned

RESEARCH AGENCY: ConnDOT Office of Research and Materials

OBJECTIVES:

To investigate and design a coherent, comprehensive, and transferable quality-assurance program for another major area of ConnDOT’s highway construction activities. The research will be accomplished through a dedicated and combined effort that merges the QA accomplishments of the Phase 1 research together with the knowledge and efforts of department and industry groups, and to execute a series of technical tasks to achieve the desired integration of the various subsystems.

PART H

Listing of Reports on Federally Funded Research Projects

Completed, Discontinued, or Reassigned

Highway Safety Projects

R.P. HS 412-002-180 - Skid Resistance of Pavement and Bridge Decks

1. Dougan, C. E., "Preliminary Observations on Pavement Surface Skid Resistance," May 1968.

2. Dougan, C. E., "Skid Resistance on Connecticut Highways," September 1968.

3. Ganung, G. A., "Development and Implementation of a Skid Test Program in Connecticut, Report 1," April 1971.

4. Ganung, G. A., and Christman, R., "Development and Implementation of a Skid Test Program in Connecticut, Report 2, 1971 Activities," April 1972.

R.P. HS 7412-1206 - Friction Testing of the Secondary Road System in Connecticut

1. Ganung, G. A., "Friction Survey of the State Secondary System, Report 1," April 1973.

2. Ganung, G. A., "Friction Survey of the State Secondary System, Report 2," March 1974.

R.P. 170-158 - FHWA Task Order No. 1, Field Installation and Evaluation of Post-Mounted Delineators

1. Liptak, R. E., "Field Installation and Evaluation of Post-Mounted Delineators - Final Report," Report No. 158-F-80-9, July 1980.

R.P. 170-199 - FHWA Task Order No. 2, Pavement Patching Demonstration and Evaluation

1. Ganung, G. A., et al., "Field Application and Evaluation of Pavement Patching Materials - Final Report," Report No. 199-F-81-1, January 1981.

R.P. 170-983 - Development of an FHWA Implementation Package for the Connecticut Impact Attenuation System (CIAS)

1. Division of Research Staff, "A Guide for the Repair of the Connecticut Impact-Attenuation System (CIAS)," Report No. FHWA-CT-91-983, November 1991.

2. Lohrey, E. C., "Connecticut Impact Attenuation System (CIAS)," Informational Brochure, Report No. FHWA-CT-91-983, November 1991.

Highway Safety Projects (continued)

R.P. 77-171 - RTAP Project #65, Local Road Superintendents Handbook on Supervisory Practices

1. Transportation Institute, Technology Transfer Center, "RTAP Project #65 Pilot Workshop Summary Report," June 1990.

2. Huffmire, D. W., "Successful Supervision for Local Road Supervisors - A Handbook to Help You Manage, Motivate, Communicate," June 1990.

3. Huffmire, D. W., "Managing, Motivating and Communicating Your Way to Successful Supervision - An Instructor's Guide for a Workshop for Local Road Supervisors," June 1990.

R.P. 300-77 – Devon Railroad Bridge Monitoring

1. D’Attilio, P.F., Feldblum, E.G., Lauzon, R.G., “Strain Monitoring of the Devon Railroad Bridge,” December 2001.

PART I

Listing of Reports on Federally Funded Research Projects

State (Highway) Planning and Research Projects

HPR-36 - Continuously Reinforced Concrete Pavement, I-84, Southington

1. Dougan, C. E., "Construction of the Continuously Reinforced Concrete Pavement, I-84, Southington," January 1964.

2. Dougan, C. E., "Performance of the Continuously Reinforced Concrete Pavement After Three Years of Service, I-84, Southington," November 1965.

3. Sternberg, F. E., "Report on Distressed Area in the Continuously Reinforced Concrete Pavement, I-84, Southington," April 1965.

4. Sternberg, F. E., "Report on Condition and Performance of the Steel Bridge Finger-Type Terminal Joints on Continuously Reinforced Concrete Pavement, I-84, Southington," July 1965.

5. Sternberg, F. E., "Report on Failure of Welded Wire Fabric Reinforcement in Continuously Reinforced Concrete Pavement, I-84, Southington," March 1967.

6. Sternberg, F. E., "Performance of Continuously Reinforced Concrete Pavement, I-84, Southington - Final Report," June 1969.

HPR-39 - Experimental Bituminous Concrete Study, Southbury-Middlebury

1. Bowers, D. G., "Experimental Bituminous Concrete Pavement Study, Southbury-Middlebury I, Construction Report," January 1967.

2. Sternberg, F. E., "Experimental Bituminous Concrete Pavement Study, Route I-84, Southbury and Middlebury, Report 2 Analysis of Various Data Obtained During and After Construction," February 1968.

3. Sternberg, F. E., "Recommended Additional Control of the Depth of Bituminous Pavement During Construction," May 1965.

HPR-40 - Experimental Bituminous Concrete Study, Groton

1. Bowers, D. G., "Experimental Bituminous Concrete Pavement Study, Rt. I-95, Groton, Report I, Construction," June 1965.

2. Bowers, D. G., "Experimental Bituminous Concrete Pavement Study Rt. I-95, Groton, Report II, Analysis of Various Data Obtained During and After Construction," October 1970.

3. Bowers, D. G., and Sternberg, F. E., "Final Report on Experimental Bituminous Concrete Pavements - I-84, Southbury-Middlebury, I-95, Groton," August 1972.

HPR-55 - Experimental Self-Stressing Concrete, Route 2, Glastonbury

1. Dougan, C. E., "An Experimental Self-Stressing Concrete Pavement, Rt. 2, Glastonbury I, Construction Report," April 1964. Published in TRB Record #112.

2. Dougan, C. E., "An Experimental Self-Stressing Concrete Pavement, Route 2, Glastonbury: II, Four Year Pavement Evaluation," March 1968.

3. Bowers, D. G., "An Experimental Self-Stressing Concrete Pavement, Route 2, Glastonbury: III, Final Report," January 1971. Published in TRB Record #291.

4. Christman, R., "Corrosion on Reinforcement, Experimental Self-Stressing Concrete Pavement, Route 2, Glastonbury," May 1971.

HPR-219 - Statistical Quality Control of Plant-Mixed Bituminous Concrete

1. Sternberg, F. E., Statistical Quality Control of Plant-Mixed Bituminous Concrete," March 1971.

HPR-227 - Comparison of Traffic Paints

1. Button, E. F., DeLoach, W., and Kos, F., "Evaluation of Centerlines Applied by Contractors During 1969," February 1970.

2. Button, E. F., "Comparison of Representative Traffic Paints," April 1972.

HPR-228 - Vehicle Behavior Under Real Conditions at Impact-Attenuation Devices

1. Bowers, D. G., and Hudson, J. H., "Photographic Surveillance of Highway Safety Devices," March 1973.

2. Bowers, D. G., "Vehicle Behavior Under Real Conditions at Impact-Attenuation Devices - Final Report," June 1975.

HPR-331 - Effects of Deicing Salts on Soils and Vegetation

1. Button, E. F., "Determination of the Effects of Deicing Salts Upon Trees, Shrubs, and Soils - Report 1," November 1973.

2. Rubins, E. J., "Summary of 175-331 Soil Samples - 1973," December 1973.

3. Button, E. F., Rubins, E. J., Woodward, M. A., and Griffin, G. F., "Effects of Deicing Salts and Lead Upon Trees, Shrubs and Soils in Connecticut," Final Report, January 1977. Report No. 331-F-76-9.

HPR-332 - Loading History of Selected Bridges - I-95

1. Bowers, D. G., "Loading History, Span No. 10, Yellow Mill Pond Bridge, I-95, Bridgeport, Connecticut," June 1971.

2. Bowers, D. G., Summary Report - Loading History - Span No. 10, Yellow Mill Pond Bridge, I-95, Bridgeport, Connecticut," January 1973.

HPR-339 - Photologging

1. Bowers, D. G., Hudson, J. H., and Sugland, L. E., "Operations Manual for Photolog System," Connecticut Department of Transportation, March 1974.

2. Bowers, D. G., "Photologging Guidelines for the Update and Refilming of the State Highway System," Connecticut Department of Transportation, April 1976. Report No. 339-2-76-5

HPR-343 - Implementation of Research Findings

1. Button, E. F., "Implementation Package for Vegetation and Erosion Control Under Guide Rails and Median Barriers," March 1969.

2. Christman, R., "Report to the Legislature on the Performance and Effects of Studded Tires," December 1972.

3. Christman, R., "Report to the Legislature on the Performance and Effects of Studded Tires - Report II," January 1974.

4. Lane, K. R., "Installation of a Tire-Sand Internal Barrier System in Connecticut," August 1975.

5. Buckley, W., Hudson, J., and Bowers, D., "An Open-Graded Bituminous Concrete Overlay, I-91, Cromwell-Wethersfield - Construction Report," October 1975.

6. Button, E. F., and Kasinskas, M. M., "Snow and Ice Control - ConnDOT Research, Operations and Policy," December 1975.

7. Christman, R., "Comments Offered by the Connecticut Department of Transportation on Kennametal, Inc. Report Entitled 'Studded Tires, The Winter Winner,'" February 1976.

8. Dougan, C. E., "ConnDOT Use of the Transportation Research Board's (TRB) Research Correlation Service," Report No. 343-1-76-8, July 1976.

9. Lane, K. R., "Laboratory Tests on a Mechanical Strain Gage Recorder," Report No. 343-1-76-12, October 1976.

10. Button, E. F., "Performance of a Tire-Sand Inertial Barrier System in Connecticut - Final Report," Report No. 343-F-77-6, May 1977.

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HPR-343 - Implementation of Research Findings (continued)

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PART J

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1. Bowers, D. G., "Test Installation of Compression Seals in Transverse Joints, Route 2, Colchester," March 1967 (Departmental).

2. Bowers, D. G., "Experimental Joints Formers and Seals, Route 2, Colchester," Final Report, March 1973 (Departmental).

R.P. 175-169 - Bridge Deck Inspection, I-91

1. Wilson, J. S., (Memo Report) "Field Inspection of Bridge Decks on I-91, New Haven to Hartford," October 1967.

R.P. 175-204 - Traffic Surveillance and Control

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5. Dawson, R. F., and Perruccio, W. B., "Summary Report - I-84, Freeway Surveillance and Control Project," September 1969.

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1. Bruno, J., and Perruccio, W. B., "Signal Progression - Package Procedure Manual," July 1970.

R.P. 175-204, #2 - Capacity Program

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2. "Procedure Manual for Intersection Capacity."

3. "Procedure Manual for Intersection Capacity of Exclusive Turning Lanes."

4. "Procedure Manual for Ramp Capacity."

5. "Procedure Manual for Weaving Capacity."

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R.P. 175-211 - Product Evaluation

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2. Research Liaison Committee, “Product Use Status Lists for Connecticut Department of Transportation,” Report No. 211-3-94-7, May 1994.

3. Research Liaison Committee, “Product Use Status Lists for Connecticut Department of Transportation,” Report No. 211-3-95-6, August 1995.

4. Research Liaison Committee, “Product Use Status Lists for Connecticut Department of Transportation Projects,” Report No. 211-4-96-9, June 1996.

5. Research Liaison Committee, "Product Use Status Lists for Connecticut Department of Transportation Projects," Report No. 211-5-97-3, June 1997.

6. Research Liaison Committee, “Product Use Status List for Connecticut Department of Transportation Projects,” Report No. 211-6-98-5, October 1998.

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R.P. 175-212 - South Road Curved Girder Bridge

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R.P. 175-216 - Pavement Grooving and Grooved Line Striping, I-84, Waterbury

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4. Christman, R. "The Effects of Studded Tires, Minnesota Department of Highways - Report Review for Implications Applicable to Connecticut Department of Transportation," August 1971.

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R.P. 175-225 - Development of the Air Jet Snow Plow

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Miscellaneous

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2. Sternberg, F. E., "A Statistically Based Plan for Acceptance Control, 1 Four-Inch Bituminous Concrete Pavement Depth," June 1969.

R.P. 850-50 - Development of a Rail Photolog

1. Bowers, D. G., "Index to ConnDOT Rail Photolog," Report No. RP-1-80-20, December 1980.

2. Bowers, D. G., and Hudson, J. H., "User's Manual - Second Generation Photolog-Filming Equipment, Report No. RP-F-83-10, March 1983.

R.P. 850-51 - Highway User Cost in Connecticut

1. Staff, "Highway User Costs in Connecticut," Report No. 850-51-F-82-1, February 1982.

PART K

Films and Videotapes

PART K

Listing of Films and Videotapes

ConnDOT Research Materials

16mm FILM

HPR-332 - Loading History of Selected Bridges - I-95

1. "Loading Histories of Selected Bridges on I-95 in Connecticut," 1973.

HPR-396 - Evaluation of the Use of Salt Brine for Deicing Purposes

1. "Liquid Roadway Deicing," June 23, 1978.

HPR-402 - Crash Testing of an Energy-Absorbing Truck Bumper System

1. "Portable Barrier - Truck Mounted, Crash Test #1," 1971 Maverick, 2260 lbs., Calspan, October 13, 1976.

2. "Portable Barrier - Truck Mounted, Crash Test #2," 1970 Pontiac, 4500 lbs., Calspan, October 13, 1976.

3. "Portable Barrier - Truck Mounted, Crash Test #3," 1973 Plymouth, 4480 lbs. Calspan, November 1, 1976.

4. "Portable Barrier - Truck Mounted, Crash Test #4," 1973 Plymouth, 4470 lbs., Calspan, November 1, 1976.

5. "Development of the Connecticut Crash Cushion, Truck Mounted Attenuator (TMA)," January 1, 1978.

6. "Crash Cushion - Truck Mounted, Crash Test #3777-1," Chevy Vega, 2300 lbs., Texas Trans. Institute, July 26, 1978.

7. "Crash Cushion - Truck Mounted, Crash Test #3777-2," Plymouth Fury, 4470 lbs., Texas Trans. Institute, July 27, 1978.

HPR-876 - Connecticut Impact-Attenuation System (CIAS)

1. "Connecticut Impact-Attenuation System (CIAS), Crash Test No. RF4765-1," 4500-lb. veh., Texas Transportation Institute, October 5, 1982.

2. "Connecticut Impact-Attenuation System (CIAS), Crash Test No. RF4765-2," 1800-lb. veh., Texas Transportation Institute, October 25, 1982.

3. "Connecticut Impact-Attenuation System (CIAS), Crash Test No. RF4765-3," 4500-lb. veh., Texas Transportation Institute, December 15, 1982.

4. "Connecticut Impact-Attenuation System (CIAS), Crash Test No. RF4765-4," (Rerun of 3, modified), 4500-lb. veh., Texas Transportation Institute, March 2, 1983.

16mm FILM (continued)

HPR-876 - Connecticut Impact-Attenuation System (CIAS) (continued)

5. "Connecticut Impact-Attenuation System (CIAS), Crash Test No. RF4765-5," 4500-lb. veh., Texas Transportation Institute, August 9, 1983.

6. "Connecticut Impact-Attenuation System (CIAS), Crash Test No. RF4765-6," (Rerun of 1, modified), 4500-lb. veh., Texas Transportation Institute, May 16, 1983.

7. "Connecticut Impact-Attenuation System (CIAS), Crash Test No. RF4765-7," 1800-lb. veh., Texas Transportation Institute, October 6, 1983.

8. "Connecticut Impact-Attenuation System (CIAS), Crash Test No. RF4765-8," (4' system), 4500-lb. veh., Texas Transportation Institute, August 11, 1983.

9. "Connecticut Impact Attenuation System (CIAS), Crash Test No. RF4765-9," (Restored tubes), 4500-lb. veh., Texas Transportation Institute, October 4, 1983.

10. "Connecticut Impact-Attenuation System (CIAS),” 12 minutes, 16mm color/sound film, January 28, 1985.

11. "Connecticut Impact-Attenuation System (CIAS); Crash Test: Special test with 5387-lb. pickup," Contract #DTFH61-82-C-00086, S.W. Research Inst., April 7, 1987.

HPR-1221 - Crash Testing of a Narrow-Site Crash Cushion

1. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-1-87," Type 53, (Contract #4 Original), Ensco, Inc., January 6, 1987.

2. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-2-87," Type 50, (Contract #1 Original), Ensco, Inc., January 16, 1987.

3. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-3-87," Type 52, (Contract #2 Original), Ensco, Inc., May 19, 1987.

4. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-4-87, Type 40, (Contract #6 Original), Ensco, Inc., August 9, 1987.

5. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-5-87," Type 40, (Contract #6 1st RERUN), Ensco, Inc., November 17, 1987.

6. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-6-88," Type 53, (Contract #4 1st RERUN), Ensco, Inc., May 16, 1988.

7. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-7-88," Type 53, (Contract #4 2nd RERUN), Ensco, Inc., June 20, 1988.

8. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-8-88," Type 54, (Contract #3 Original), Ensco, Inc., July 25, 1988.

9. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-9-88," Type 54, (Contract #3 1st RERUN), Ensco, Inc., July 27, 1988.

16mm FILM (continued)

HPR-1221 - Crash Testing of a Narrow-Site Crash Cushion (continued)

10. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1794-10-88," Type 53, (Contract #4 3rd RERUN), Ensco, Inc., August 29, 1988.

11. "Connecticut Narrow Site Impact Attenuator (NCIAS); Crash Test No. 1947-11-88," Type 52, (Contract #2 1st RERUN), Ensco, Inc., December 15, 1988.

12. "The Narrow Connecticut Impact-Attenuation System (NCIAS)," May 1, 1991.

HPR-1340 - Generalized Design for the Connecticut Impact-Attenuation System - Phase II, Crash Tests, and Phase III, Field Evaluation

1. "Generalized Connecticut Impact-Attenuation System (GCIAS), Crash Test No. G1-50-1," S.W. Research Inst., May 11, 1989.

2. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 1, Crash Test No. 2088-1-90," Ensco, Inc., November 1, 1990.

3. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 2, Crash Test No. 2088-2-91," Ensco, Inc., February 8, 1991.

4. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 2, Modified, Crash Test No. 2088-3-91," Ensco, Inc., August 29, 1991.

5. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 3, Crash Test No. 2088-4-91," Ensco, Inc. November 19, 1991.

6. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 2, Crash Test No. 2088-5-91," Ensco, Inc., November 20, 1991.

7. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 2, Crash Test No. 2088-6-92," Ensco, Inc., December 8, 1992.

SPR-2216 - “350” Crash Testing of Connecticut Impact-Attenuation Systems

1. “Connecticut Truck-Mounted Attenuator (CTMA) Test No. 405214-1 (NCHRP Report 350. Test No. 2-51),” 16mm Work Print Film, Connecticut DOT, November 2, 1994.

2. “Connecticut Truck-Mounted Attenuator (CTMA) Test No. 405214-2 (NCHRP Report 350. Test No. 2-52),” 16mm Work Print Film, Connecticut DOT, November 3, 1994.

3. “Connecticut Truck-Mounted Attenuator (CTMA) Test No. 405214-3 (NCHRP Report 350. Test No. 2-53),” 16mm Work Print Film, Connecticut DOT, January 3, 1995.

175-225 - Development of the Air Jet Snow Plow

1. "Airplow Testing," 1971.

Miscellaneous

1. "Timber Barrier Tests," 1975.

2. "Highway As Environment, Research Project," 1975.

VIDEOTAPE

HPR-396 - Evaluation of the Use of Salt Brine for Deicing Purposes

1. "Liquid Roadway Deicing," June 23, 1978.

HPR-402 - Crash Testing of an Energy-Absorbing Truck Bumper System

1. "Development of the Connecticut Crash Cushion, Truck Mounted Attenuator (TMA)," 1978.

(Individual test films listed in 16mm FILM section of PART X.)

HPR-876 - Connecticut Impact-Attenuation System (CIAS)

1. "Connecticut Impact-Attenuation System (CIAS)," January 28, 1985.

(Individual test films listed in 16mm FILM section of PART X.)

HPR-1084 - Installation and Evaluation of Protective Coatings for Structural Steel in Connecticut

1. "Metallizing: Theory and Application," December 1, 1989.

HPR-1221 - Crash Testing of a Narrow-Site Crash Cushion

1. "NCIAS" (Narrow Connecticut Impact-Attenuation System)," May 1, 1991.

(Individual test films listed in 16mm FILM section of PART X.)

HPR-1340 - Generalized Design for the Connecticut Impact-Attenuation System - Phase II, Crash Tests, and Phase III, Field Evaluation

1. "Generalized Connecticut Impact-Attenuation System (GCIAS), Crash Test No. G1-50-1," S.W. Research Inst., May 11, 1989.

2. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 2, Crash Test No. 2088-2-91," Ensco, Inc., February 8, 1991.

3. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 2, Modified, Crash Test No. 2088-3-91," Ensco, Inc., August 29, 1991.

4. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 2, Crash Test No. 2088-4-91," Ensco, Inc., November 19, 1991.

5. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 2, Crash Test No. 2088-5-91," Ensco, Inc., November 20, 1991.

6. "Generalized Connecticut Impact-Attenuation System (GCIAS), Design 2, Crash Test No. 2088-6-92," Ensco, Inc., December 8, 1992.

VIDEOTAPE (continued)

HPR-1346 - Monitoring of Cathodic Protection Systems

1. "Cathodically Protected Bridge, Southington, CT," November 1, 1989.

SPR-2216 - "350" Crash Testing of Connecticut Impact-Attenuation Systems

1. "NCHRP 350 Crash Tests 2-50, 51, 52 & 53, Connecticut Truck Mounted Attenuator - Tests 405241/1,2&3, Abbreviated VHS Video Version," Connecticut DOT, December 1, 1994.

2. "NCHRP 350 Crash Tests 2-50, 51, 52 & 53, Connecticut Truck Mounted Attenuator - Tests 405241/1,2&3, Full VHS Video Version," Connecticut DOT, December 1, 1994.

3. "Connecticut Truck-Mounted Attenuator (CTMA) Tests Nos. 405214-1, 2 & 3 (NCHRP Report 350 Tests Nos. 2-51, 2-52 & 2-53)," Abbreviated VHS Video Version, Connecticut DOT, January 1995.

4. "Connecticut Truck-Mounted Attenuator (CTMA) Tests Nos. 405214-1, 2 & 3 (NCHRP Report 350 Tests Nos. 2-51, 2-52 & 2-53)," Full VHS Video Version, Connecticut DOT, January 1995.

5. "Merritt Parkway Timber Rail (MPG) Test No. 405501-1 (NCHRP Report 350 Test No. 3-11)," VHS Video, Connecticut DOT, December 14, 1995.

6. "Merritt Parkway Timber Rail (MPG) Test No. 405501-2 (NCHRP Report 350 Test No. 3-10)," VHS Video, Connecticut DOT, February 7, 1996.

7. "Merritt Parkway Timber Rail (MPG) Test No. 405501-3 (NCHRP Report 350 Test No. 3-11 w/curb)," VHS Video, Connecticut DOT, February 8, 1996.

8. "Merritt Parkway Timber Rail (MPG) Test No. 405501-4 (NCHRP Report 350 Test No. 3-21)," VHS Video, Connecticut DOT, February 28, 1996.

9. "NCHRP 350 Crash Test No. 405501-1, Merrit Parkway Timber Rail," Connecticut DOT, April 1, 1996.

10. "NCHRP 350 Crash Test No. 405501-2, Merrit Parkway Timber Rail," Connecticut DOT, April 1, 1996.

11. "NCHRP 350 Crash Test No. 405501-3, Merrit Parkway Timber Rail," Connecticut DOT, April 1, 1996.

12. "NCHRP 350 Crash Test No. 405501-4, Merrit Parkway Timber Rail," Connecticut DOT, April 1, 1996.

13. "Connecticut Impact Attenuation System (CIAS) Tests Nos. 405651-1&2 (NCHRP Report 350 Tests Nos. 3-32 & 3-38)," VHS Video, Connecticut DOT, May 1996.

14. "NCHRP 350 Crash Test No. 405651, Parts 1 & 2, Connecticut Impact Attenuation System," Connecticut DOT, August 1, 1996.

VIDEOTAPE (continued)

SPR-2216 - "350" Crash Testing of Connecticut Impact-Attenuation Systems (continued)

15. "Connecticut Impact Attenuation System (CIAS) Test No. 405651-3 (NCHRP Report 350 Test No. 3-35)," VHS Video, Connecticut DOT, October 14, 1997.

16. "Connecticut Impact Attenuation System (CIAS) Test No. 405651-4 (NCHRP Report 350 Test No. 3-33)," VHS Video, Connecticut DOT, October 27, 1997.

17. "Narrow Connecticut Impact Attenuation System (NCIAS) Test No. 404231-1 (NCHRP Report 350 Test No. 3-33)," VHS Video, Connecticut DOT, October 28, 1997.

18. "Narrow Connecticut Impact Attenuation System (NCIAS) Test No. 404231-2 (NCHRP Report 350 Test No. 3-32)," VHS Video, Connecticut DOT, December 15, 1997.

19. "Narrow Connecticut Impact Attenuation System (NCIAS) Test No. 404231-3 (NCHRP Report 350 Test No. 3-37)," VHS Video, Connecticut DOT, December 16, 1997.

20. "Narrow Connecticut Impact Attenuation System (NCIAS) Test No. 404231-4 (NCHRP Report 350 Test No. 3-38)," VHS Video, Connecticut DOT, March 2, 1998.

21. "Narrow Connecticut Impact Attenuation System (NCIAS) Test No. 404231-5 (Repeat of NCHRP Report 350 Test No. 3-38)," VHS Video, Connecticut DOT, June 8, 1998.

22. "Narrow Connecticut Impact Attenuation System (NCIAS) Test No. 404231-6 (NCHRP Report 350 Test No. 3-39)," VHS Video, Connecticut DOT, June 9, 1998.

23. "Connecticut Impact Attenuation System (CIAS) Test No. 404231-7 (NCHRP Report 350 Test No. 3-34)," VHS Video, Connecticut DOT, April 19, 1999.

SPR-2219 – Demonstration and Evaluation of SUPERPAVE™ Technologies

1. "Roads that Last Superpave," FOX 61 and ConnDOT, July 1997.

Miscellaneous

1. "Corrosion on the Bridge Over Rt. 17, Middletown," September 29, 1989.

2. "Hydrodemolisher - Waterbury," Field Tape, October 12, 1989.

3. "Q-Bridge: Overlay Removal, Sounding and Patching," Field Tape, October 30, 1990.

4. "Chipping Paint - Overhead Sign Support," Field Tape, M. M. Kasinskas, September 4, 1991.

5. "New Inspection Instrumentation for Steel Structures," 1970.

VIDEOTAPE (continued)

Miscellaneous (continued)

6. "NCIAS & CIAS Crashes - Actual Impacts with Unmanned Camera," December 1991.

7. "1. Connecticut Impact Attenuation System (CIAS) and 2. Narrow Connecticut Impact Attenuation System (NCIAS)" combined copies of two videotapes, 1992.

8. "They Move Connecticut - The Department of Transportation," October 1991.

9. “Open House December 4, 1993, 2800 Berlin Turnpike, Newington, CT,” December 1993.

10. “Business Today Show Preservation Pointers EAS Inc. Triton Barrier,”

11. “Demonstration of Telespar’s Unistrut Breakaway Sign Support. Installation and Vehicle Impact. Brook St.,” ConnDOT, October 17, 1994.

12. “National Traffic Data Acquisition Conference 1994 (NATDAC ‘94), Rocky Hill, CT, September 18-22, 1994, Volumes 1-16,” ConnDOT, September 22, 1995.

13. “National Traffic Data Acquisition Conference 1994 (NATDAC ‘94), Rocky Hill, CT, September 18-22, 1994, 28 Tapes (original unedited editions),” ConnDOT, September 22, 1995.

14. “ConnDOT Managers’ Meeting, Unedited - Volume 1” November 17, 1993.

15. “ConnDOT Managers’ Meeting, Unedited - Volume 1” November 17, 1995.

16. “Construction of the Arrigoni Bridge,” ConnDOT, February 1998.

PART L

Films and Videotapes from Other Sources

PART L

Listing of Films and Videotapes Obtained from Other Sources

VIDEOTAPE

Federal Agencies, NCHRP & SHRP

1. "Open Roads: A Look at FHWA - Freeway Incident Management," FHWA-SA-91-011, March 1, 1991.

2. "Ramp Metering: Signal for Success," FHWA.

3. "Go for the Green," FHWA.

4. "Truck Impact on Pavements," FHWA, April 15, 1988.

5. "Caution, Litigation Ahead: The Road to Effective Risk Management," FHWA, April 15, 1988.

6. "Better Inductive Loop Detectors," FHWA & NY DOT, January 27, 1986.

7. "AAMAS," NCHRP 9-6, SHRP, June 21, 1991.

8. "SHRP - Long Term Pavement Performance Study Overview," SHRP.

9. "Technical Advancements for Maintenance Workers - for Maintenance Managers and Work Crews," SHRP, October 10, 1990.

10. "Technical Advancements for Maintenance Workers - for Chief Administrative Officers," SHRP, October 10, 1990.

11. "Paving the Way for Tomorrow's Highways," SHRP, January 15, 1989.

12. "Washington State Traffic Data Collection - Nichols Consulting," SHRP, June 1, 1991.

13. "Pavement Management Systems," U.S. Army CRREL, July 2, 1991.

14. "Unsurfaced Road Management," U.S. Army CRREL, July 2, 1991.

15. "Scrap Rubber in Pavement," U.S. Army CRREL, July 2, 1991.

16. "Inspecting Unsurfaced Roads," U.S. Army CRREL, July 2, 1991.

17. "Introduction to FERF (Frost Effects Research Facility)," U.S. Army CRREL, July 2, 1991.

18. "FERF (Frost Effects Research Facility)/Technical," U.S. Army CRREL, July 2, 1991.

19. "Crack Sealing Flexible Asphalt Pavement," U.S. Army CRREL, July 2, 1991.

20. "Safety Restoration During Snow Removal," FHWA, October 1989.

21. "FWD Calibration Centers: Why Do We Need Them? Contract P-007A," SHRP, September 1989.

VIDEOTAPE (continued)

Federal Agencies, NCHRP & SHRP (continued)

22. "SUPERPAVE: Asphalt Pavements That Perform," SHRP, February 1992.

23. "Concrete Bridge Protection Repair and Rehabilitation, Contract C-103," SHRP, March 1992.

24. "New Work Zone Safety Devices, Contract H-109 & H-110," SHRP, March 1992.

25. "Effective Snow Fences; Contract H-110: Part 1 - Benefits (For Chief Admin. Officers); and Part 2 - Key Elements (For Technical and Operational Staff)," SHRP, January 1991.

26. "NOW Exhibit - 191 AASHTO Technology Transfer Fair (Topics: Worker Safety, Snow and Ice Control, Highway Maintenance, Concrete, Asphalt, LTPP)," SHRP, January 1991.

27. "Pontis, A New Generation Bridge Management System," U.S. DOT.

28. "Maintenance Data Collection," NCHRP.

29. "Northeast States Asphalt User/Producer Group Workshop on Asphalt Binder Equipment and Specifications." (6 cassetts), FHWA, October 29, 1992.

30. “MPO PM Practices - Local Road Management System,” FHWA, October 19, 1993.

31. “ISTEA PM Elements - PM Concepts and Theory,” FHWA, October 19, 1993.

32. “Opening Remarks: National Perspectives Regional Perspectives,” FHWA, October 19, 1993.

33. “Metrication for Pavement Management: Institutional Barriers,” FHWA, October 19, 1993.

34. “1993 AASHTO Pavement Design Guide & Computer Program - Crumb Rubber Asphalt,” FHWA, October 19, 1993.

35. “Traffic Barriers and Control Treatments for Restricted Work Zones, NCHRP 17-8,” NCHRP.

36. “Snow and Ice Control,” H-200 Series Contracts, No. 20, SHRP.

37. “New Research Into Cost-Effective Pavement Repairs,” Contract H-106, No. 4, SHRP.

38. “Evaluation Procedures for Deicing Chemicals,” Contract H-205, SHRP.

39. “Distress Identification Manual,” Contract, SHRP.

40. “Pavement Management and Worker Safety,” H-100 Series Contracts, No. 19, SHRP, March 11, 1993.

41. “Plows of the Future,” Contract H-206, No. 21, SHRP.

VIDEOTAPE (continued)

Federal Agencies, NCHRP & SHRP (continued)

42. “Introduction to Rehabilitation of Highway Concrete #22,” SHRP, June 1, 1994.

43. “Quality Control of Concrete Site, Part 1,” SHRP, June 1, 1994.

44. “Quality Control of Concrete Site, Part 2,” SHRP, June 1, 1994.

45. “Quality Control of Concrete Site, Part 3,” SHRP, June 1, 1994.

46. “Quality Control of Concrete Site, Part 4,” SHRP, June 1, 1994.

47. “Concrete Pavement Overlays #27,” SHRP, June 1, 1994.

48. “Bridge Deck Overlays,” SHRP, June 1, 1994.

49. “Alkali-Silica Testing #29,” SHRP, June 1, 1994.

50. “Freeze-Thaw Testing,” SHRP, June 1, 1994.

51. “Full-Depth Repair of Jointed Concrete Pavement,” SHRP, June 1, 1994.

52. “Early Opening of Full-Depth Concrete Repairs,” SHRP, June 1, 1994.

53. “Partial-Depth Repair of Concrete Pavement #33,” SHRP, June 1, 1994.

54. “GIS-T Pooled Fund Study, Phase A Overview,” FHWA Pooled Fund, July 1994.

55. “Staying Ahead of the Storm,” Road Weather Information Systems, Contract H-107, January 1, 1995.

56. “Access Management Overview,” FHWA Office of Technology, May 1997.

57. “Visualization in Transportation,” Transportation Research Board, November 1998.

58. “Visualization in Transportation – NCHRP Synthesis 229,” Transportation Research Board, November 1998.

Other State & Connecticut Agencies

1. "The Forgiving Highway," CAL TRANS.

2. "Leaf Composting - Windrows of Opportunity," Connecticut Department of Environmental Protection, July 1, 1990.

3. "Videolog Van," Idaho Transp. Dept.

4. "Pasco Road Survey, Demo Proj. 72," Iowa DOT.

5. "1 for 3 Pasco Road Survey System (PRS) Development," Iowa DOT.

6. "ARAN, Maine," ME DOT, June 21, 1991.

7. "GPS/GIS Multi-State Project," OH DOT, September 1, 1990.

VIDEOTAPE (continued)

Other State & Connecticut Agencies (continued)

8. "Idea Store, Ed. 1," PA DOT, January 15, 1989.

9. "Idea Store, Ed. 2," PA DOT, May 15, 1989.

10. "Idea Store, Ed. 3," PA DOT, November 24, 1989.

11. "Idea Store, Ed. 4," PA DOT, June 6, 1990.

12. "Idea Store, Ed. 5," PA DOT, March 26, 1991.

13. "Idea Store, Ed. 6," PA DOT, September 6, 1991.

14. "Idea Store, Ed. 7," PA DOT, August 1, 1992.

15. "The So. Dakota Road Profiler," S. Dakota DOT.

16. "Getting There From Here," Vermont Agency of Trans., January 1, 1987.

17. "Video Logging," Washington State DOT.

18. “California’s Heavy Duty Vehicle Inspection Program,” CALTRANS, March 5, 1993.

19. “Headlight Glare Screen Material Performance Impact Test, February 17 and March 5, 1993,” Nevada DOT, February 17, 1993.

20. “Research Review Day,” Oklahoma DOT, April 1998.

21. “Emergency Response to Electric Vehicles,” California Department of Forestry and Fire Protection, February 1999.

22. “Bicycle-Friendly Rumble Strips,” Colorado Department of Transportation, September 2001

Industry Materials

1. "MAGLEV - Hudson Valley."

2. "Sil-Act," Advanced Chem. Technol.

3. "Pavement Marking Inspection: Thermoplastic," Am. Traf. Safety Serv. Assn.

4. "Sound Off," Sound Barriers, Cor Tec.

5. "Applause II - Demonstration Video for Software," Ashton Tate, April 1, 1991.

6. "Zinc Metallizing," Zinc Institute.

7. "Application of LMC (Latex Modified Concrete), Training Video," BASF, June 21, 1991.

8. "BASF Styrofan 1186, Latex Modified Concrete - The Crossing of Lake Washington," BASF, June 21, 1991.

9. "C-LOC, Michigan Fisheries Installation," C-Loc.

VIDEOTAPE (continued)

Industry Materials (continued)

10. "Coating Demonstration of IC Coating 531 Water Based Inorganic Zinc Silicate Coating System," CSI Blaster/Painters, April 16, 1986.

11. "Dura-phalt Applications," Dura-Phalt, Inc., May 3, 1990.

12. "Elgard Anode Ribbon Installation Over Exposed Rebar," Elgard, February 17, 1988.

13. "G-R-E-A-T, Greater, Greatest," Energy Absorp. Syst., Inc.

14. "ARAN: Keeping an Eye on the Road," Highway Products Int'l, March 18, 1991.

15. "The C50L Huckbolt Fastening System," Huck Mfg. Co., September 1, 1990.

16. "IBC MK-VII Barrier Maintenance," Int'l Barrier Corp.

17. "IBC vs. Concrete Barrier Cost Comparison," Int'l Barrier Corp., May 3, 1989.

18. "IBC - A New Highway Barrier NTSC 525," Int'l Barrier Corp., May 15, 1988.

19. "IBC - Introduction, Technical Briefing and Assembly," Int'l Barrier Corp.

20. "IBC - MK-7 Barrier Truck," Int'l Barrier Corp., July 15, 1989.

21. "IBC - Mark IX Barrier Median," Int'l Barrier Corp.

22. "Perma-Zyme," Int'l Enzymes, Inc., February 1, 1991.

23. "Ipanex Concrete - Pennsylvania Turnpike, Case History," IPA Systems, Inc., June 13, 1990.

24. "Jack Carney - News Story - CIAS Crash Test - NBC TV Nashville," Jack Carney, January 28, 1991.

25. "Rubbish Plant-Mixed Pavement," This Old House, February 1, 1990.

26. "An Introduction to Polymer Modified Microsurfacing," Koch Materials Co.

27. "ODT Ralumac," Koch Materials Co.

28. "Pavetech," Pavetech.

29. "VERGLIMIT - Demo of Installation on Tappan Zee Bridge," PK Innovations.

30. "I-90 Reconstruction in South Dakota & Minnesota, 1986" Portland Cement Assn., November 15, 1986.

31. "Rehabilitation of Interstate I-20/I-59 Meridian, Mississippi," Portland Cement Assn., November 15, 1986.

32. "Dragnet Vehicle Arresting System," Rdway. Safety Serv., Inc.

VIDEOTAPE (continued)

Industry Materials (continued)

33. "It's Nature's Way - The Composting Solution," Solid Waste Composting Co., April 1, 1991.

34. "CAT - Crash Cushion Attenuating Terminal, ET-2000," Syro Steel Co.

35. "The Tire Pond," The Tire Pond, Inc., November 15, 1990.

36. "Thorotop HCR," Thoro System Products.

37. "Projection 16X7 TUBIG - WALL," Tubig.

38. "QPR 2000 - Quality Pavement Repair," U.S. Protec, Inc.

39. "Vari Spec Batteryless Flasher," Vari Spec.

40. "Bituthene System 4000," W. R. Grace, February 17, 1989.

41. "Bituthene Contractor Training Video," W. R. Grace, February 17, 1989.

42. "LoCorr Deicer - Good News Travels Fast," Akzo.

43. "Telecommunications and Office Automation Specialists for the 90's," Shared Technologies, Inc.

44. "Syro Steel Co., 1. C-A-T, 2. ET-2000, 3. ADIEM, 4. CIAS, 5. NCIAS," Syro Steel Company.

45. "Making Rheology Accessible to the Asphalt Paving Industry," Bohlin Instruments.

46. "Macrovision - Protecting Your Image," Macrovision.

47. "Cine Magnetics Video - A World of Difference," Cine Magnetics.

48. "The C50L Huckbolt Fastening System," Huck.

49. “American Inland Divers, Inc. Sonar Scour Vision Demo,” American Inland Divers, Inc.

50. “PageTap, The Door to Tomorrow,” PageTap, Inc.

51. “The Diamond Advantage in Highway Grinding,” International Grooving and Grinding, October 7, 1993.

52. “GlasGrid Reinforcing Mesh,” Bay Mills, March 19, 1992.

53. “Josto (CONN) LTD Water Hydromilling Tape,” Josto (CONN) LTD.

54. “Poxy Coat II,” Int’l Coating and Chemical Co., August 5, 1994.

55. “Highway Cold In-Place Recycling,” C&R Associates, August 11, 1994.

56. “PH-100 Pothole Repair Compound,” Plastic Flamecoat Syst., April 1, 1995.

VIDEOTAPE (continued)

Industry Materials (continued)

57. “Dia-Thane 2000 & RX101 for Lead Abatement Encapsulation,” Pyrochek International,” January 1, 1995.

58. “Enduraseal 300 Asphalt Rejuvenator,” Cascadia International.

59. “ProScan - Computerized Scanning and Reduction of Manual Profilograph Traces,” Devore Systems, Inc., September 1, 1990.

60. “A Day in the Life of Video F/X,” Digital F/X.

61. “Plastic Flamecoat Systems,” Plastic Flamecoat Systems.

62. “LOTUS - Make the Smart Move to Lotus Ami Pro,” LOTUS.

63. “Matrix-UPS Series,” American Power Conversions.

64. “Sopralene Antirock Soprema Roofing,” Soprema Roofing Waterproofing.

64. “Pile Cap Underwater Pile Encapsulation System,” Pile Cap.

65. “Turner Company Plastic Manhole Rings,” Turner Company.

66. “Alacrity E-Quip Work Group Imaging,” Alacrity Systems Incorporated.

67. “Sedimat,” Indian Valley Industries, February 27, 1996.

68. “Nevada DOT Headlight Glare Screen Impact Test," Nevada DOT, February 27, 1993.

69. “Safe Hit ITL Reports,” Safe Hit.

70. “Futerra Clearly the Leader,” Conwed Fibers, May 9, 1996.

71. “Watchdog Perimeter Workzone Intrusion Alarm System," Kenco International Inc., June 17, 1996.

72. “Raupave,” Waymark Group, June 19, 1996.

73. "Poz-Loc Slipbase System," Southwestern Pipe, Inc., 1996.

74. "Guardian Safety Barrier, NCHRP 350 Test Level 3," Safety Barrier Systems, 1997.

75. "Stormceptor," Stormceptor Corporation, 1997.

76. "Asphalt Rubber Chip Seal," All States Asphalt, 1997.

77. “The Gripper,” Trident Technologies, June 1997.

78. “Guardian Safety Barrier,” Safety Barrier Systems, June 1997.

79. “Pagetap – The Door to Tomorrow,” Pagetap Inc., June 1997.

80. “The Minnesota Local Road Research Board,” Minnesota LRRB, March 1998.

VIDEOTAPE (continued)

Industry Materials (continued)

81. "Sonic Dry Clean," U.S. Filter, April 1998.

82. "NETC 4 Bar Sidewalk Mounted Bridge Railing NCHRP 350 TL 4," Southwest Research Institute, April 1999.

83. "Driving the Chevy S-10 Electric Pickup Truck," General Motors, June 1999.

Part M

Listing of New England Transportation Consortium (NETC) Projects FY03

PART M

Listing of New England Transportation Consortium (NETC) Projects

FY03

umber	Study Title	Status	Anticipated Completion Date	Project Closed Date
Pre-1994 Projects				
Pre-1994 Project	Construction Costs of New England Bridges - Phase II	Closed	-	4/2/03
Pre-1994 Project	Tire Chips as Lightweight Backfill – Phase II: Full-Scale Testing	Closed	-	4/2/03
Pre-1994 Project	Bridge Rail Crash Test – Phase II: Sidewalk Mounted Rail	Closed	-	4/2/03
Pre-1994 Project	New England Vehicle Classification and Truck Weight Program	Closed	-	4/2/03
FY94 Projects				
NETC 94-1	Structural Analysis of New England Subbase Materials and Structures	Closed	3/31/99	4/5/02
NETC 94-2	Nondestructive Testing of Reinforced Concrete Bridges Using Radar Imaging Techniques	Active	9/30/99	-
NETC 94-3 [1]	Procedures for the Evaluation of Sheet Membrane Waterproofing	Closed	9/30/99	4/2/03
NETC 94-4	Durability of Concrete Crack Repair Systems	Terminated [2]	12/31/99	4/9/01

PART M (continued)

Listing of New England Transportation Consortium (NETC) Projects

FY03

Study Number	Study Title	Status	Anticipated Completion Date	Project Closed Date
FY95 Projects				
NETC 95-1	Use of Tire/Chips/Soil Mixtures to Limit Frost Heave and Pavement Damage of Paved Roads	Closed	12/31/97	9/21/00
NETC 95-2	Suitability of Non-Hydric Soils for Wetland Mitigation	Closed	Completion of Work (2/28/97)	12/2/97
NETC 95-3	Implementation and Evaluation of Traffic Marking Recesses for Application of Thermoplastic Pavement Markings on Modified Open Graded Mixes	Closed	8/31/99	4/11/01
NETC 95-5	Buried Joints in Short Span Bridges	Terminated [3]	Completion of Work (8/31/99)	4/9/01
NETC 95-6	Guidelines for Ride Quality Acceptance for Pavements	Closed	Completion of Work (4/30/97)	4/2/03
FY96 Projects				
NETC 96-1	SUPERPAVE Implementation	Closed	8/31/99	4/5/02
NETC 96-2	Optimizing GPS Use in Transportation Projects	Active	6/30/99	-
NETC 96-3	Effectiveness of Fiber Reinforced Composites as Structural and Protective Coverings for Bridge Elements Exposed to Deicing-Salt Chlorides	Closed	12/31/00	4/2/03

PART M (continued)

Listing of New England Transportation Consortium (NETC) Projects

FY03

Study Number	Study Title	Status	Anticipated Completion Date	Project Closed Date
FY97 Projects				
NETC 97-1 (Phase 1)	Portable Method to Determine Chloride Concentration on Roadway Pavements – Phase 1	Active	8/31/99	-
NETC 97-1 (Phase 2)	Portable Method to Determine Chloride Concentration on Roadway Pavements – Phase 2	Active	9/30/01	-
NETC 97-2	Performance Evaluation and Economic Analysis of Combinations of Durability Enhancing Admixtures (Mineral and Chemical) in Structural Concrete for Bridge Applications in the Northeast U.S.A.	Active	8/30/02	-
NETC 97-3 (Phase 1)	Determining Properties, Standards and Performance of Wood Waste Compost as an Erosion Control Mulch and as a Filter Berm – Phase 1	Closed	2/1/00	4/11/01
NETC 97-3 (Phase 2)	Determining Properties, Standards and Performance of Wood Waste Compost as an Erosion Control Mulch and as a Filter Berm – Phase 2	Closed	12/31/00	4/11/01
NETC 97-4	Early Distress of Open-Graded Friction Courses	Closed	12/31/99	4/5/02

PART M (continued)

Listing of New England Transportation Consortium (NETC) Projects

FY03

Study Number	Study Title	Status	Anticipated Completion Date	Project Closed Date
FY98/99 Projects				
NETC 99-1	Bridge Rail Transitions – Development and Crash Testing	Active	To be determined	-
NETC 99-2	Evaluation of Asphaltic Plug Joints	Active	12/31/03	-
NETC 99-3	Development of Priority Based Statewide Scour Monitoring Systems in New England	Closed	3/31/01	4/5/02
NETC 99-4	Quantifying Roadside Rest Area Usage	Closed	2/28/01	4/2/03
NETC 99-6	Analytical and Experimental Investigations of the Effects of Concrete Removal Operations on Adjacent Concrete that is to Remain	Closed	2/28/02	11/19/02

PART M (continued)

Listing of New England Transportation Consortium (NETC) Projects

FY03

Study Number	Study Title	Status	Anticipated Completion Date	Project Closed Date
FY00 Projects				
NETC 00-1	Ground-Based Imaging and Data Acquisition Systems for Roadway Inventories in New England: A Synthesis of Practice	Closed	8/31/01	4/2/03
NETC 00-2	Evaluation of Permeability of Superpave Mixes	Closed	12/15/01	11/19/02
NETC 00-3	Composite Reinforced Timber Guardrail – Phase I: Design, Fabrication and Testing	Active	5/31/03	-
NETC 00-4	Portable Falling Weight Deflectometer (FWD) Study	Active	6/30/04	-
NETC 00-5	Guard-Rail Testing – MELT @ NCHRP 350 TL-2	Closed	4/30/02	11/19/02
NETC 00-6	Implementation of Visualization Technologies to Create Simplified Presentations by Highway Agencies	Active	6/30/03	-
NETC 00-7	A Complete Review of Incident Detection Algorithms and Their Deployment: What Works and What Doesn't	Active	6/20/02	-
NETC 00-8 [4]	Performance and Effectiveness of a Thin Pavement Section Using Geogrids and Drainage Geocomposites in a Cold Region	Active	6/30/05	-

PART M (continued)

Listing of New England Transportation Consortium (NETC) Projects

FY03

Study Number	Study Title	Status	Anticipated Completion Date	Project Closed Date
FY01 Projects				
NETC 01-1 [4]	Advanced Composite Materials (Fiber Reinforced Polymers or Polymer Matrix Composites) for New England's Highway Infrastructure: A Synthesis of Technology and Practice	Active	4/30/04	-
NETC 01-2	Development of a Testing Protocol for Quality Control/Quality Assurance of Hot Mix Asphalt	Active	12/31/02	-
NETC 01-3	Design of Superpave Hot Mix Asphalt for Low Volume Roads	Active	2/29/04	-
NETC 01-4 [5]	Eliminating Premature Pavement Failure: Creation of a Positive Drainage Layer for Reconstructed and Reclaimed Pavements	-	-	-
NETC 01-5	Procedures for the Evaluation of Liquid-Applied Membrane Waterproofing	Proposed	To be determined	-
NETC 01-6	Field Evaluation of a New Compaction Device	Active	7/31/03	-

PART M (continued)

Listing of New England Transportation Consortium (NETC) Projects

FY03

Study Number	Study Title	Status	Anticipated Completion Date	Project Closed Date
FY02 Projects				
NETC 02-1	Relating Hot Mix Asphalt Pavement Density to Performance	New Study	8/31/05	-
NETC 02-2	Formulate an Approach for 511 Implementation in New England	Active	12/31/03	-
NETC 02-3	Establish Subgrade Support Values (Mr) for Typical Soils in New England	Active	1/31/05	-
NETC 02-5	Determination of Moisture Content of De-Icing Salt at Point of Delivery	Active	12/31/03	-
NETC 02-6	Sealing of Small Movement Bridge Expansion Joints	New Study	7/31/04	-
NETC 02-7	Validating Traffic Simulation Models to Inclement Weather Conditions With Applications to Arterial Coordinated Signal Systems	Active	8/31/04	-
NETC 02-8	Intelligent Transportation Systems Applications to Ski Resorts in New England	Active	3/1/04	-

PART M (continued)

Listing of New England Transportation Consortium (NETC) Projects

FY03

Study Number	Study Title	Status	Anticipated Completion Date	Project Closed Date
FY03 Projects				
NETC 03-1	Ability of Wood Fiber Materials to Attenuate Heavy Metals Associated With Highway Runoff	New Study	8/22/05	-
NETC 03-2	Field Studies of Concrete Containing Salts of an Alkenyl-Substituted Succinic Acid	Proposed	To be Determined	-
NETC 03-3	Feasibility Study and Design of an Erosion Control Laboratory in New England	New Study	8/31/04	-
NETC 03-4	Measuring Pollutant Removal Efficiencies of Storm Water Treatment Units	New Study	2/28/05	-
NETC 03-5	Evaluation of Field Permeameter as a Longitudinal Joint Quality Control Indicator	New Study	2/28/06	-
NETC 03-7	Basalt Fiber Reinforced Polymer Composites	New Study	11/15/05	
FY04 Projects				
NETC 04-1	Recycling Asphalt Pavements Containing Modified Binders	Proposed	To be determined.	-
NETC 04-2	Driver-Eye-Movement-Based Investigation for Improving Work Zone Safety	Proposed	To be determined.	-
NETC 04-3	Estimating the Magnitude of Peak Flows for Steep Gradient Streams in New England	Proposed	To be determined.	-
NETC 04-4	Determining the Effective PG Grade of Binder in RAP Mixes	Proposed	To be determined.	-
NETC 04-5	Network-Based Highway Crash Prediction Using Geographic Information Systems	Proposed	To be determined.	-
NETC 04-6	Development of Truck Lane Software That Uses a Current Model of Truck Performance	Proposed	To be determined.	-

PART M (continued)

Listing of New England Transportation Consortium (NETC) Projects

FY03

[1] The work for Project No. NETC 94-3 was performed under Pooled Fund Project No. SPR-0003(052), "Procedures for the Evaluation of Sheet Membrane Waterproofing." Vermont was the Lead State.

[2] The Agreement for NETC Project No. 94-4, "Durability of Concrete Crack Repair Systems," expired on December 31, 1999. At its September 21, 2000, Meeting, the NETC Advisory Committee passed a motion that the Agreement for NETC Project No. 94-4 be terminated. A Notice of Expiration Letter, dated April 9, 2001, was sent to the University of Rhode Island, requesting that all work activities be ceased upon receipt of the Notice of Expiration Letter and that all materials relating to the project be submitted to NETC. At its April 5, 2002, Meeting, the NETC Advisory Committee passed a motion to approve the Technical Committee recommendations that: the Final Report not be published; and, that the outstanding unpaid invoices not be paid.

[3] At its September 21, 2000, Meeting, the NETC Advisory Committee passed a motion that the Agreement for NETC Project No. 95-5, "Buried Joints in Short Span Bridges," be terminated. The Agreement for NETC Project No. 95-5 was terminated in a Termination Letter, dated April 9, 2001, that was sent to the University of Rhode Island, requesting that all work activities be ceased upon receipt of the letter and that all materials relating to the project be submitted to NETC. At its September 26, 2001, Meeting, the NETC Advisory Committee passed a motion to approve the Technical Committee recommendations that: the Final Report not be published; and, that the outstanding unpaid balance of $3,204.39 be witheld since only 70% of the work was completed.

[4] The University of New Hampshire terminated the Agreement for NETC Project No. 01-1, "Advanced Composite Materials (Fiber Reinforced Polymers or Polymer Matrix Composites) for New England's Highway Infrastructure: A Synthesis of Technology and Practice," in a Termination Letter, dated August 14, 2002. The project was then awarded to the the University of Massachusetts, Amherst, the bidder ranked second highest in the Screening and Ranking process.

[5] NETC Project No. 01-4, "Eliminating Premature Pavement Failure: Creation of a Positive drainage Layer for Reconstructed and Reclaimed Pavements," is incorporated into NETC Project 00-8, "Performance and Effectiveness of a Thin Pavement Section Using Geogrids and Drainage Composites in a Cold Region."

Refer to the NETC Annual Report published annually on a Calendar Year basis.

PART N

Listing of the Cooperative Research Program Projects FY03

PART N

Listing of the Connecticut Cooperative Highway Research Program Projects
FY03

Study Number	Study Program	Status	Anticipated Completion	Project Closed Date
Regular Projects				
JH 94-4	Effective Use of the ConnDOT GPS Base Station	Completed	2/19/03	2/20/03
JH 97-1 (3)	Estimating Benefits from Specific Highway Safety Improvements: Phase 3	Completed	3/7/03	7/2/03
JH 99-3	Estimating Link Traffic Volumes by Month, Day of Week and Time of Day	Completed	9/17/02	9/17/02
JH 00-2	GPR for Fast Pavement Assessment	Active	5/31/04	-
JH 00-5	Field Monitoring and Evaluation for Sign Support Structures Subject to Dynamic Loads	Completed	3/7/03	7/2/03
JH 01-4	A Best Practices Guide for the Design of Context Sensitive Roadway Cross-Sections	Active	5/31/04	-
JH 01-7	An Automated Detection for Highway Geometry Using Image Recognition Models	Active	8/22/03	-
JH 02-1	Incorporating Truck Flows Into the State-Wide Planning Traffic Model	Active	5/31/04	-
JH 02-2	Developing a Methodology to Evaluate the Safety of Shared-Use Paths	Active	9/30/03	-
JH 02-11	Pilot for Automated Detection and Classification of Road Surfaces Degradation Features	Active	12/31/03	-
JH 03-2	A Laser-Based 3D Data Acquisition System for the Analysis of Pavement Distress and Roughness	Active	5/31/04	-
JH 03-5	Factors Affecting Young Driver Safety	Active	5/31/04	-
JH 03-7	Development of New Rheological Tools for Asphalt Binder and Concrete Characterization	Active	5/31/05	-
JH 03-8	Comparison of Ultrafine Particle Emissions from Hybrid-Electric and Particle-Trap Diesel Connecticut Transit Buses	Active	5/31/05	-
Letter of Intent Projects				
93-4	Hydrodynamic and Transport Models of Coastal Waters for Use in the Design and Management of Highway Structures	Active	5/31/04	-

Refer to the Joint Highway Research Advisory Council (JHRAC) Work Program and the JHRAC Summary of Activities, each published annually on a Fiscal Year basis.

Part O

Personnel Assignments to Research Committees

Project/Committee	Type of Assignment	Person(s)
AASHTO Research Advisory Committee	Member and Region 1 Chairperson (99-01)	James M. Sime
ASCE Transportation Infrastructure Management	Member	Richard C. Hanley
Connecticut Technology Transfer Center Advisory Committee	Member Member	Dionysia F. Oliveira James M. Sime
FHWA SHRP State Coordinator	State Coordinator	James M. Sime
LTPP State Coordinator	State Coordinator	Keith R. Lane
National Transportation Product Evaluation Program	Representative Representative Representative	Andrew J. Mroczkowski James M. Sime Keith R. Lane
NCHRP IDEA Committee	Member	Anne-Marie H. McDonnell
NCHRP 15-19, “Context-Sensitive Design Best Practices	Panel Member	Carl F. Bard
NCHRP 20-24 #12, “Issues Involving Delays in Completing Federal-Aid Highway and Bridge Projects”	Panel Member	Arthur Gruhn
NCHRP 20-36, “Highway Research and Technology – International Information Sharing”	Panel Member	James F. Byrnes, Jr.
NCHRP 20-39, “Improved Transportation Research-In-Progress Data System”	Panel Chairperson	James M. Sime
NCHRP 20-48, “Accessibility of Non-English Language Transportation Information Resources”	Panel Member	Betty Ambler
NCHRP 20-56, “Recommendations for AASHTO Web Site”	Member	James M. Sime
TCRP TA23, “Implementation Guidelines for Bus Rapid Transit Systems”	Member	Michael A. Sanders
TRB ETG LTPP Traffic Data	Member	Anne-Marie H. McDonnell
TRB A2A01, “Photogrammetry, Remote Sensing, Surveying and Related Automated Systems”	Member	Bradley J. Overturf
TRB A2A04,Roadside Safety Features	Representative	Dionysia F. Oliveira
TRB A2B06, “Pavement Monitoring, Evaluation and Data Storage”	Member	Edgardo D. Block
TRB A2C05, “Dynamics and Field Testing of Bridges”	Member	Robert G. Lauzon
TRB A2C05(1), “Non Destructive Evaluation of Civil Infrastructure”	Member	Robert G. Lauzon
TRB A2F09, “Applications of Emerging Technology”	Member	Richard C. Hanley
TRB A3A09, “Freeway Operations”	Member	William W. Stoeckert
TRB A5003, “Information Systems and Technology”	Member	Frank J. Busch
TRB A5008, “Artificial Intelligence”	Member	Richard C. Hanley
SPR-2(146), “Testing of Roadside Safety Systems”	TAC Member	Dionysia F. Oliveira

[Formerly HPR-0002(146)]		
SPR-2(150), “Design, Construction and Rehabilitation of Continuously Reinforced Concrete Pavements (CRCP)” [Formerly HPR-0002(150)]	TAC Member	Colleen A. Kissane
SPR-2(158), “Evaluation of Recycled Materials for Roadside Appurtenances” [Formerly HPR-0002(158)]	TAC Member	Dionysia F. Oliveira
SPR-2(163), “Calcium Magnesium Acetate (CMA) at Lower Production Cost” [Formerly HPR-0002(163)]	TAC Member	Eric C. Lohrey
SPR-2(164), “Development of a Thrie Beam Bullnose Median Barrier Terminal” [Formerly HPR-0002(164)]	TAC Member	Dionysia F. Oliveira
SPR-2(165), “Updating Existing AASHTO ‘Guide Specifications for Horizontally Curved Highway Bridges, 1980’” [Formerly HPR-0002(165)]	TAC Member	Robert G. Lauzon
SPR-2(166), “Performance Evaluation of Crumb-Rubber Modified (CRM) Asphalt Pavements” [Formerly HPR-0002(166)]	TAC Member	Donald A. Larsen
SPR-2(167), “Development of Anti-Icing Treatments” [Formerly HPR-0002(167)]	TAC Member	Not named
SPR-2(172), “Aerial Platform System for Bridge Inspection (Phase II)” [Formerly SPR-0002(172)]	TAC member	Joseph C. Kozlowski
SPR-2(176), “Validation of SHRP Asphalt and Asphalt Mixture Specifications Using Accelerated Loading” [Formerly SPR-0002(176)]	TAC Member	Nelio J. Rodrigues
SPR-2(181), “National Vehicle Detector Test Center” [Formerly SPR-0002(181)]	TAC Member	Anne-Marie H. McDonnell
SPR-2(182), “Development and Validation of Traffic Data Editing Procedures (TDEP)” [Formerly SPR-0002(182)]	TAC Member	Anne-Marie H. McDonnell
SPR-2(184), “Long Term Monitoring of Mitigating Corrosion Measures” [Formerly SPR-0002(184)]	TAC Member	Andrew J. Mroczkowski
SPR-2(199), “Optimal Acceptance Procedures for Statistical Construction Specifications” [Formerly SPR-0002(199)]	TAC Member	Steven A. Gage
SPR-2(203), “Truck/Pavement Economic Modeling and In-Situ Field Testing Data Analysis Applications” [Formerly SPR-0002(203)]	TAC Member	David J. Kilpatrick

SPR-2(207), “Transportation Management Center Pooled Fund Study (TMC PFS)” [Formerly SPR-0002(207)]	TAC Member	Harold J. Decker, Jr.
SPR-2(208), “Pavement Subgrade Performance Study” [Formerly SPR-0002(208)]	TAC Member TAC Member	Leo L. Fontaine David J. Kilpatrick
SPR-2(211), “Bulk Specific Gravity Round Robin Using the Corelok Vacuum Sealing Device” [Formerly SPR-0002(211)]	TAC Member	James M. Mahoney
SPR-2(800), “SHRP Implementation of Asphalt Test Equipment” [Formerly HPR-0002(800)]	TAC Member	James M. Sime
SPR-3(017), “Midwest States Pooled Fund Crash Test Program” [Formerly SPR-0003(017)]	TAC Member	Dionysia F. Oliveira
SPR-3(022), “Tidal and Coastal Hydraulics – Phases 1, 2 & 3” [Formerly SPR-0003(022)]	TAC Member	Michael E. Hogan
SPR-3(029), “New England Transportation Consortium (NETC): FY 1995 to FY 1999” [Formerly SPR-0003(029)]	TAC Member and Lead Engineer Advisory Committee Member Policy Committee Member	Dionysia F. Oliveira* James M. Sime Comr. James F. Byrnes
SPR-3(031), “Reusable Truck Mounted Attenuator” [Formerly SPR-0003(031)]	TAC Member	Dionysia F. Oliveira
SPR-3(035), “Travel Model Improvement Program” [Formerly SPR-0003(035)]	TAC Member	Not named
SPR-3(041), “New England Transportation Technician Certification Program (NETTCP) – Course Development” [Formerly SPR-0003(041)]	TAC Member	Keith R. Lane
SPR-3(043), “Development of a New Guardrail End Treatment – Phase II” [Formerly SPR-0003(043)]	TAC Member	Dionysia F. Oliveira
SPR-3(050), “New England Traffic Monitoring System” [Formerly SPR-0003(050)]	TAC Member	Joseph T. Cristalli, Jr.
SPR-3(052), “Procedures for the Evaluation of Sheet Membrane Waterproofing” [Formerly SPR-0003(052)]	TAC Member	Dionysia F. Oliveira
SPR-3(056), “Superpave Implementation Support – The Northeast Superpave Center (NECEPT)” [Formerly SPR-0003(056)]	TAC Member	Keith R. Lane
SPR-3(058), “Crash Testing – Weak Post System – Phase II” [Formerly SPR-0003(058)]	TAC Member	Dionysia F. Oliveira
SPR-3(071), “A New Approach to Assessing Road User Charges”	TAC Member	Charles S. Barone

[Formerly SPR-0003(071)]		
SPR-3(081), “High-Speed Electromagnetic Roadway Mapping and Evaluation System (HERMES) II” [Formerly SPR-0003(081)]	TAC Member	Eric G. Feldblum
SPR-3(082), “Quantifying Segregation in Hot-Mix Asphalt” [Formerly SPR-0003(082), “Evaluation of the Next Generation Pavement Quality Indicator (PQI) Device”]	TAC Member	Donald A. Larsen
SPR-3(084), “Use of Dynamic Modulus (E*) in Hot-Mix Asphalt Designs” [Formerly SPR-0003(084)]	TAC Member	James M. Sime
SPR-3(089), “New England Transportation Consortium (NETC): FY2000 to Present” [Formerly SPR-0003(089)]	TAC Member and Lead Engineer Advisory Committee Member Policy Committee Member	Dionysia F. Oliveira* James M. Sime Comr. James F. Byrnes
TPF-5(002), “Updating ‘A Guide to Standardized Highway Lighting Pole Hardware” [Formerly SPR-0003(103)]	TAC Member	Jon Andrews
TPF-5(004), “Long Term Pavement Performance (LTPP) Specific Pavements Study (SPS) Traffic Data Collection” [Formerly SPR-0002(217), “LTPP Specific Pavements Study (SPS) Traffic Data Collection”]	TAC Member	Anne-Marie H. McDonnell
TPF-5(008), “Development of Computer Based Training (CBT) Lessons” [Formerly SPR-2(183)]	TAC Member	James M. Sime
TPF-5(009), “Computer-Based, Self-Operating Training System on Anti-Icing/Road Weather Information Systems (AI/RWIS)” [Formerly SPR-0003(104)]	TAC Member	George E. Carbonell
TPF-5(010), “Structural Improvements of Flexible Pavements Using Geosynthetics for Base Course Reinforcement”	TAC Member TAC Member	Leo L. Fontaine David J. Kilpatrick
TPF-5(016), “Micropile Systems for Highway Bridges”	TAC Member	Leo L. Fontaine
TPF-5(019), “Full Scale Accelerated Performance Testing for Superpave and Structural Validation”	TAC Member	Edgardo D. Block
TPF-5(024), “Next Generation Retro-Reflective Beads for Traffic Paints”	TAC Member	John P. Carey
TPF-5(026), “Durability of Segmented Retaining Wall Blocks” [Formerly SPR-0002(218)]	TAC Member	Robert G. Lauzon
TPF-5(038), “Automated Geotechnical Information and Design System (AGIDS)”	TAC Member	Leo L. Fontaine
TPF-5(045), "Performance Guidelines	TAC Member	Charles A. Drda

for the Selection of Hot-Pour Crack Sealants"		
TPF-5(046), “Transportation Curriculum Coordination Council (TCCC) Training Management and Development”	TAC Member	Cheryl L. Wallace
TPF-5(062), "Coordination of Pavement Activities in the Northeast"	TAC Member	Keith R. Lane
TPF-5(063), "Improving the Quality of Pavement Profiler Measurement"	TAC Member	Donald A. Larsen
TP5-5(068), "Long-Term Maintenance of Load and Resistance Factor Design Specifications"	TAC Member	TBD (Formerly Gordon D. Barton)
TPF-5(069), "Core Program Services for a Highway Research, Development, and Technology Program, TRB Fiscal Year 2004"	TAC Member	James M. Sime
TPF-5(073), "Portable Non-Intrusive Technologies (PNIT)"	TAC Member	Anne-Marie H. McDonnell
TPF-5(076), “Development of Geotechnical Procedures/Operations Manual”	TAC Member	Leo L. Fontaine
TPF-5(080), “Investigation of Low Temperature Cracking in Asphalt Pavements”	TAC Member	David J. Kilpatrick
NETC Pre-1994 Project, “Construction Costs of New England Bridges - Phase II”	TAC Member	William Duff
NETC Pre-1994 Project, “Tire Chips as Lightweight Backfill – Phase II: Full-Scale Testing”	TAC Member	Not named
NETC Pre-1994 Project, “Bridge Rail Crash Test – Phase II: Sidewalk Mounted Rail”	TAC Member	Dionysia F. Oliveira
NETC Pre-1994 Project, “New England Vehicle Classification and Truck Weight Program”	TAC Member	William Duff
NETC 94-1, “Structural Analysis of New England Subbase Materials and Structures”	TAC Member	Leo L. Fontaine
NETC 94-2, “Nondestructive Testing of Reinforced Concrete Bridges Using Radar Imaging Techniques”	Procedures for the Evaluation of Sheet Membrane Waterproofing	Kevin J. Bernard
NETC 94-3, “Procedures for the Evaluation of Sheet Membrane Waterproofing”	TAC Member	Not named
NETC 94-4, “Durability of Concrete Crack Repair Systems”	TAC Member	Kevin J. Bernard
NETC 95-1, “Use of Tire/Chips/Soil Mixtures to Limit Frost Heave and Pavement Damage of Paved Roads”	TAC Member	Donald A. Larsen
NETC 95-2, “Suitability of Non-Hydric Soils for Wetland Mitigation”	TAC Member	Steven Ladd
NETC 95-3, “Implementation and	TAC Member	John R. Giannini

Evaluation of Traffic Marking Recesses for Application of Thermoplastic Pavement Markings on Modified Open Graded Mixes”		
NETC 95-5, “Buried Joints in Short Span Bridges”	TAC Chairperson	Robert G. Lauzon,
NETC 95-6, “Guidelines for Ride Quality Acceptance for Pavements”	TAC Member TAC Member	Keith R. Lane Colleen A. Kissane
NETC 96-1, “SUPERPAVE Implementation”	TAC Member	Nelio J. Rodrigues
NETC 96-2, “Optimizing GPS Use in Transportation Projects”	TAC Member	Bradley J. Overturf
NETC 96-3, “Effectiveness of Fiber Reinforced Composites as Structural and Protective Coverings for Bridge Elements Exposed to Deicing-Salt Chlorides”	TAC Member	John W. Henault
NETC 97-1 (Phases 1 and 2), “Portable Method to Determine Chloride Concentration of Roadway Pavements – Phases 1 and 2”	TAC Member	Donald A. Larsen
NETC 97-2, “Performance Evaluation and Economic Analysis of Combinations of Durability Enhancing Admixtures (Mineral and Chemical) in Structural Concrete for Bridge Applications in the Northeast U.S.A.”	TAC Member	Steven A. Gage
NETC 97-3 (Phases 1 and 2), “Determining Properties, Standards and Performance of Wood Waste Compost as an Erosion Control Mulch and as a Filter Berm – Phases 1 and 2”	TAC Member	Donald A. Larsen
NETC 97-4, “Early Distress of Open-Graded Friction Courses”	TAC Member	Nicholas R. Corona
NETC 99-1, “Bridge Rail Transitions – Development and Crash Testing”	TAC Member	Dionysia F. Oliveira
NETC 99-2, “Evaluation of Asphaltic Plug Joints”	TAC Member	Donald A. Larsen
NETC 99-3, “Development of Priority Based Statewide Scour Monitoring Systems in New England”	TAC Chairperson TAC Member TAC Member	Ahmad A. Sarshory Paul F. D’Attilio James E. Hamilton
NETC 99-4, “Quantifying Roadside Rest Area Usage”	TAC Member	Dionysia F. Oliveira
NETC 99-6, “Analytical and Experimental Investigations of the Effects of Concrete Removal Operations on Adjacent Concrete that is to Remain”	TAC Chairperson	Ravi V. Chandran
NETC 00-1, “Ground-Based Imaging and Data Acquisition Systems for Roadway Inventories in New England: A Synthesis of Practice”	TAC Chairperson	Bradley J. Overturf
NETC 00-2, “Evaluation of Permeability of Superpave Mixes”	TAC Member	Nelio J. Rodrigues

NETC 00-3, “Design, Fabrication and Testing of a Composite Reinforced Timber Guardrail”	TAC Member	Dionysia F. Oliveira
NETC 00-4, “Portable Falling Weight Deflectometer (FWD) Study”	TAC Member	Donald A. Larsen
NETC 00-5, “Guard Rail Testing – MELT at NCHRP 350 TL2”	TAC Member	Andrew J. Mroczkowski
NETC 00-6, “Implementation of Visualization Technologies to Create Simplified Presentations by Highway Agencies”	TAC Member	William S. Pratt
NETC 00-7, “A Complete Review of Incident Detection Algorithms and Their Deployment: What Works and What Doesn’t”	TAC Member	TBD (Formerly Michael C. Healy)
NETC 00-8, “Performance and Effectiveness of a Thin Pavement Section Using Geogrids and Drainage Geocomposites in a Cold Region”	TAC Member	David J. Kilpatrick
NETC 01-1, “Advanced Composite Materials (Fiber Reinforced Polymers or Polymer Matrix Composites) for New England’s Highway Infrastructure: A Synthesis of Technology and Practice”	TAC Member	Paul F. D’Attilio
NETC 01-2, “Development of a Testing Protocol for Quality Control/Quality Assurance of Hot Mix Asphalt”	TAC Member	Jonathan T. Boardman
NETC 01-3, “Design of Superpave Hot Mix Asphalt for Low Volume Roads”	TAC Member	Nelio J. Rodrigues
NETC 01-5, “Procedures for the Evaluation of Liquid-Applied Membrane Waterproofing”	TAC Member	Andrew J. Mroczkowski
NETC 01-6, “Field Evaluation of a New Compaction Device”	TAC Member	Leo L. Fontaine
NETC 02-1, “Relating Hot Mix Asphalt Pavement Density to Performance”	TAC Member	Edgardo D. Block
NETC 02-2, “Formulate an Approach for 511 Implementation in New England”	TAC Member	Harold J. Decker, Jr.
NETC 02-3, “Establish Subgrade Support Values for Typical Soils (Mr) in New England”	TAC Chairperson	Leo L. Fontaine
NETC 02-5, “Determination of Moisture Content of Deicing Salt at Point of Delivery”	TAC Member	John R. Giannini
NETC 02-6, “Sealing of Small Movement Bridge Expansion Joints”	TAC Member	Andrew J. Mroczkowski
NETC 02-7, “Validating Traffic Simulation Models to Inclement Weather Conditions with Applications to Arterial Coordinated Signal Systems”	TAC Member TAC Member	TBD (Formerly Michael C. Healy) Eric G. Feldblum
NETC 02-8, “Intelligent Transportation Systems Applications to Ski Resorts in New England and	TAC Member	Harold J. Decker, Jr.

Northeastern New York State”		
NETC 03-1, “Ability of Wood Fiber Materials to Attenuate Heavy Metals Associated With Highway Runoff”	TAC Member	Mark W. Alexander
NETC 03-2, “Field Studies of Concrete Containing Salts of an Alkenyl-Substituted Succinic Acid”	TAC Chairperson	Paul F. D’Attilio
NETC 03-3, “Feasibility Study and Design of An Erosion Control Laboratory in New England”	TAC Chairperson	Donald A. Larsen
NETC 03-4, “Measuring Pollutant Removal Efficiencies of Storm Water Treatment Units”	TAC Member	Paul N. Corrente
NETC 03-5, “Evaluation of Field Permeameter as a Longitudinal Joint Quality Control Indicator”	TAC Member	Erika B. Smith
NETC 03-7, “Basalt Fiber Reinforced Polymer Composites”	TAC Chairperson	Anne-Marie H. McDonnell
NETC 04-1, “Recycling Asphalt Pavements Containing Modified Binders”	TAC Member	Edgardo D. Block
NETC 04-2, “Driver-Eye-Movement-Based Investigation for Improving Work Zone Safety”	TAC Member	Susan C. Maloney
NETC 04-3, “Estimating the Magnitude of Peak Flows for Steep Gradient Streams in New England”	TAC Member	Michael E. Hogan
NETC 04-4, “Determining the Effective PG Grade of Binder in RAP Mixes”	TAC Member TAC Member (Alternate)	Nelio J. Rodrigues Raffaele Donato
NETC 04-5, “Network-Based Highway Crash Prediction Using Geographic Information Systems”	TAC Chairperson	Erika B. Smith
NETC 04-6, “Development of Truck Lane Software That Uses a Current Model of Truck Performance”	TAC Member	Daniel A. Gladowski